Noise Element

of the Bakersfield Metropolitan Area General Plan

City of Bakersfield
Development Services Department
November 1985

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NOISE ELEMENT OF THE
BAKERSFIELD METROPOLITAN AREA
GENERAL PLAN

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TABLE OF CONTENTS

LIST OF TABLES PAGE

LIST OF FIGURES

LIST OF APPENDICES (continued) PAGE

SUMMARY OF THE ELEMENT

The purpose of the Noise Element of the General Plan is to identify, measure, and propose solutions for the sources of intrusive noise throughout the City of Bakersfield. This is done by the city in recognition of the fact that noise, particularly excessive levels of noise, can have a detrimental effect on the health and welfare of its citizens, and to comply with State mandates.

To determine the level of noise in Bakersfield, measurements were taken at eighty-two (82) locations throughout the city. Because of the intrusive nature and level of noise involved, particular emphasis was placed on residential locations adjacent to the freeways, the major arterial corridor areas, railroads, and the airports. These measurements indicate the following:

1. The community noise equivalent level (CNEL) at some residential locations adjacent to the freeways is in the range of 75 to 85 dB. Federal studies indicate that these levels of noise will compromise the welfare of residents exposed for a long period of time.

2. Traffic on major arterials throughout the city produces noise levels which exceed the proposed exterior CNEL standard of 65 dB. Residences adjacent to these sites are exposed to undesirable levels of noise.

3. Projected operations at the Bakersfield Airpark will generate a significant impact at residences in the vicinity of the airport. This is primarily a result of early morning crop-duster flights.

4. Train movements along the AT & SF and the Southern Pacific rail lines generate a CNEL in excess of 65 dB at nearby residential locations.

5. Approximately sixty-three (63) noise-sensitive locations throughout the metropolitan area are exposed to noise levels in excess of accepted standards.

In recognition of these problems, and to prevent future ones from developing, a policy program has been developed as follows:

1. Noise barriers or other noise mitigation techniques will be required in new subdivisions if developed along State highways, city streets, or railroads where the existing or projected exterior CNEL at nearby noise-sensitive locations is greater than 65 dB.

2. Noise barrier construction along State highways will be pursued where the existing or projected CNEL at nearby residential zones and other noise-sensitive locations is greater than 65 dB.

3. Noise barrier construction will be pursued along the AT & SF and Southern Pacific rail line corridors where residential zones exist adjacent to the main tracks and switching yards.

4. The city will encourage the AT & SF and Southern Pacific railways to reduce the level of noise produced by train movements within the city.

5. The city will encourage the implementation of noise control procedures at the Bakersfield Airpark and will consider methods by which noise exposure due to aircraft flyovers may be minimized within the city.

6. Where appropriate, the city will participate in the planning for development at Meadows Field with respect to possible noise impacts.

7. The city will encourage the implementation of noise control procedures by the Rio Bravo Airport and will consider methods by which noise exposure due to aircraft flyovers may be minimized within the city.

8. The city will address noise control in the review of the exterior living space of all new residential developments within noise impact areas.

9. The city will require noise control for the interior living spaces of all new residential developments within noise impact areas.

10. The city will apply noise insulation requirements for the conversion of existing apartments into condominiums.

11. The city will consider noise control requirements for all new equipment purchases.

12. The city will review existing and proposed projects located near noise-sensitive uses with the intent to reduce unnecessary noise.

13. The city will place conditions of approval on all new residential developments in proximity to existing commercial-industrial operations, the Mesa Marin raceway, and the Lake Ming boat races to control the interior noise levels within the homes or residential units.

14. The city will place conditions of approval on all new commercial/industrial operations in proximity to existing or proposed residential areas.

INTRODUCTION

Physical health, psychological stability, social cohesion, property values, and economic productivity are factors affected by excessive amounts of noise. Noise, as it has been simply defined, is "unwanted sound". It is an undesirable byproduct of transportation and industrial activities within the community that permeates the environment and causes disturbance. The full effect of such noise on the individual and the community will vary with its duration, its intensity, and the tolerance level of the individual.

The City is attempting to achieve CNEL goals of 45 (decibels) dB for interior living spaces and 65 dB for exterior living spaces. Implementation of the Noise Element and noise control procedure (Appendix VI) is an attempt to not significantly increase the costs of housing construction. In lieu of a separate acoustical analysis, the appropriate application of the noise control procedure (Appendix VI) may be acceptable to the Building Official as possible mitigation for excessive noise exposure in residential construction.

AUTHORIZATION

Recognizing the increasing human environmental impacts of noise pollution and the impact that local land uses and circulation have on the community's environmental quality, the California Legislature, in 1972, mandated that a noise element be included as part of the city and county general plans. Guidelines have been prepared by the Office of Noise Control, State Department of Health as a result of Senate Bill 860(A) (which amends Section 65302 of the Government Code) concerning the specific requirements for a noise element.

PURPOSE

The purpose of the Noise Element is to serve as an official guide to the City Council, the Planning Commission, city departments, individual citizens, business people, and private organizations concerned with noise pollution within the City of Bakersfield.

The Noise Element provides a reference to be used in connection with actions on various public and private development matters as required by law, and is utilized to establish uniformity of policy and direction within the city concerning actions to minimize or eliminate noise pollution and to make decisions regarding proposals which may have an impact on the city's environment.

The Noise Element includes definitions, objectives, policies, standards, criteria, programs, maps and noise control procedures which are to be considered when decisions are made affecting the noise environment within the City of Bakersfield.

GOALS STATEMENT

- To establish standards and provide sufficient information concerning the community noise environment so that noise may be effectively considered in the land use planning process.

- To develop strategies for the mitigation of excessive noise exposure. A noise control procedure (Appendix VI) is available as a possible mitigation technique.

- To protect those existing regions of the city for which noise environments are considered acceptable and those locations throughout the city which are considered "noise sensitive".

- To establish the community noise environment (in the form of noise contours) for local compliance with the State mandated Noise Insulation Standards.

- To encourage the reduction of noise from various sources such as motor vehicles, and industrial and commercial activities which generate excessive and intrusive noise.

- To promote increased public awareness concerning the effects of noise.

- To provide methods by which the public may assist in reducing noise.

The sections that follow provide a discussion of the methods used to measure and analyze the noise environment of the City of Bakersfield. The results of the analysis will then be compared with accepted standards to determine where the city is affected by adverse levels of noise. This will lead to a description of a policy and action program designed to minimize (or eliminate) these adverse levels and prevent future problems from occurring.

NOISE EVALUATION AND MEASUREMENT

A description of the character of a particular noise requires the following:

1. The amplitude and amplitude variation of the acoustical wave,

2. The frequency (pitch) content of the noise, and

3. The duration of the noise.

Definitions of the most commonly used terms encountered in community noise assessments and noise control are provided in Appendix II. Of these terms, the A-weighted sound pressure level (identified as dB{A}) is the scale of measurement which is most useful in community noise measurement. This sound level is measured in decibels to provide a scale with the range and characteristics most consistent with that of peoples' sensitivity to sounds.

The A-weighted sound level, its application to the CNEL measure of noise exposure, and its utility in the description of ambient noise levels are discussed in the remainder of this section.

A-Weighted Sound Level

To establish the A-weighted sound level, the acoustical signal is detected by the microphone and then filtered to weight those portions of the noise which are most annoying to individuals. This weighting of sound energy corresponds approximately to the relative annoyance experienced by humans from noise at various

frequencies. The sound levels of a few typical sources of noise which are routinely experienced by people within the City of Bakersfield are listed in Figure 1.

The A-weighted sound level of traffic noise and other long-term noise producing activities within and around a community varies considerably with time. Measures of this varying noise level are accomplished by obtaining statistical samples. For the purposes of this study, the following statistical values have been used:

L_{90} - The near minimum sound level. This value is exceeded 90% of the time during the measurement period.

L_{50} - The central tendency of the sound level. This value is exceeded 50% of the time during the measurement period.

L_{10} - The near maximum sound level. This value is exceeded 10% of the time during the measurement period.

L_{eq} - The energy equivalent sound level. This value is representative of the long-term annoyance potential as well as other effects of the noise.

These measures may be recorded so as to obtain representative samples of the noise during certain time periods (e.g., peak traffic period, morning, afternoon, night, etc.).

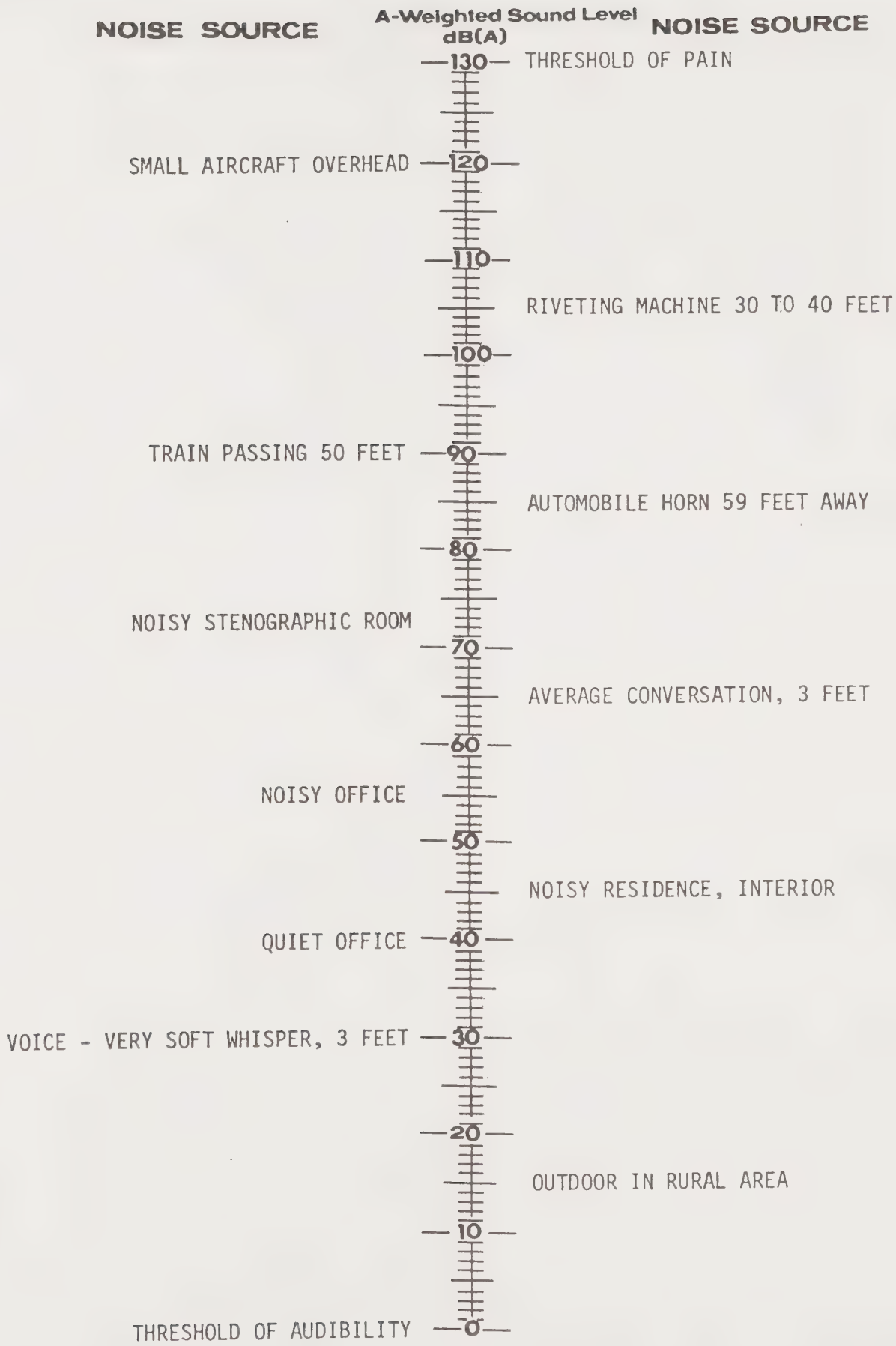


Figure 1 - Representative Noise Sources and Sound Levels

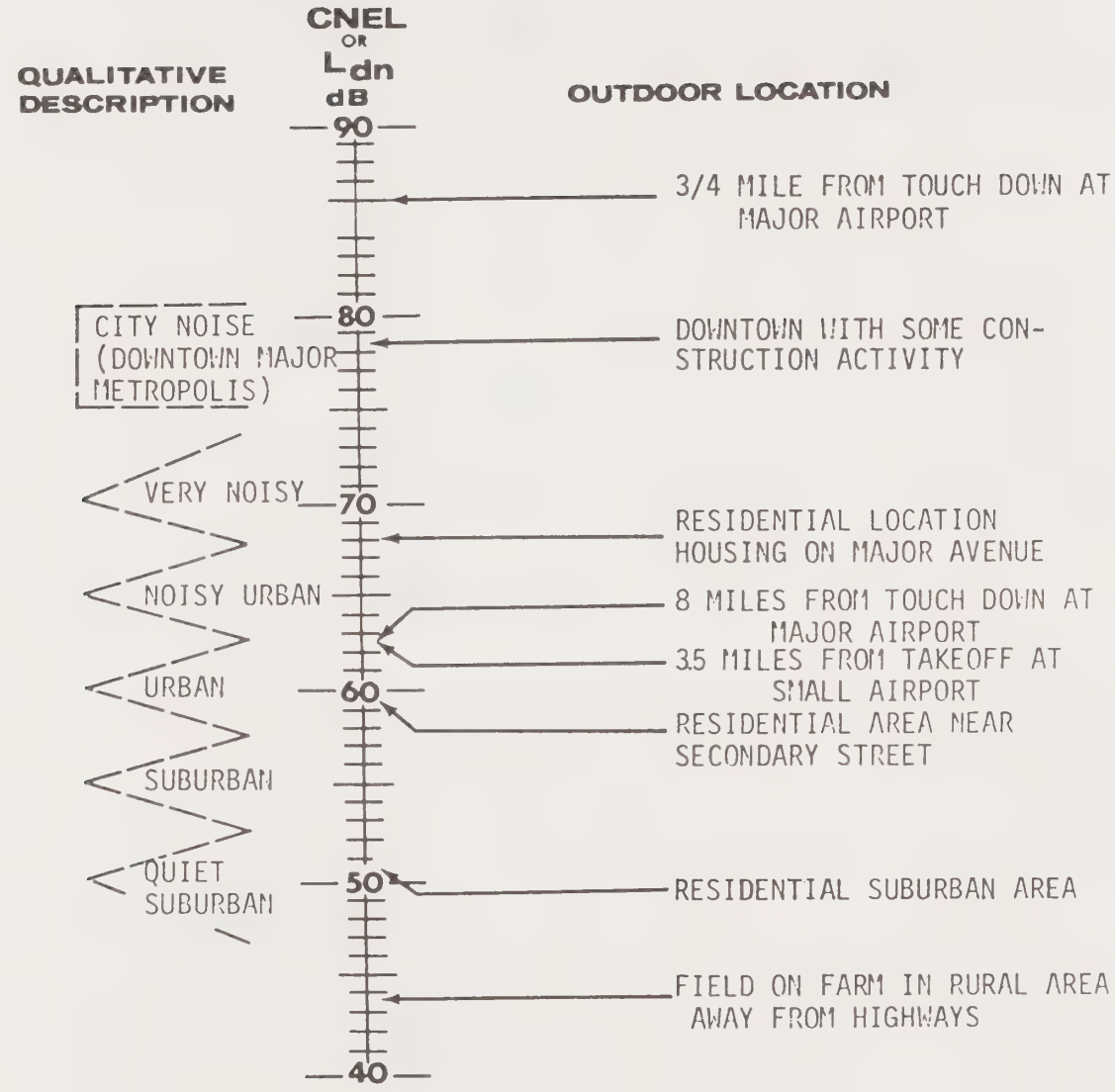
Community Noise Equivalent Level (CNEL)

It is recognized that a given level of noise may be more or less tolerable depending on the duration of exposure and the time of day during which the noise is experienced. There are several measures of noise exposure which consider not only the variation of noise level but also include temporal characteristics. Of these, the State Department of Aeronautics and the California Commission of Housing and Community Development have adopted the CNEL. This measure weights the average noise level for the evening hours (from 7:00 p.m. to 10:00 p.m.) by 5 dB, and the late evening and early morning hours (from 10:00 p.m. to 7:00 a.m.) by 10 dB. The unweighted daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value. Figure 2 indicates the outdoor CNEL at typical locations throughout the Southern California area.

Acceptable Exterior Noise Exposures - CNEL

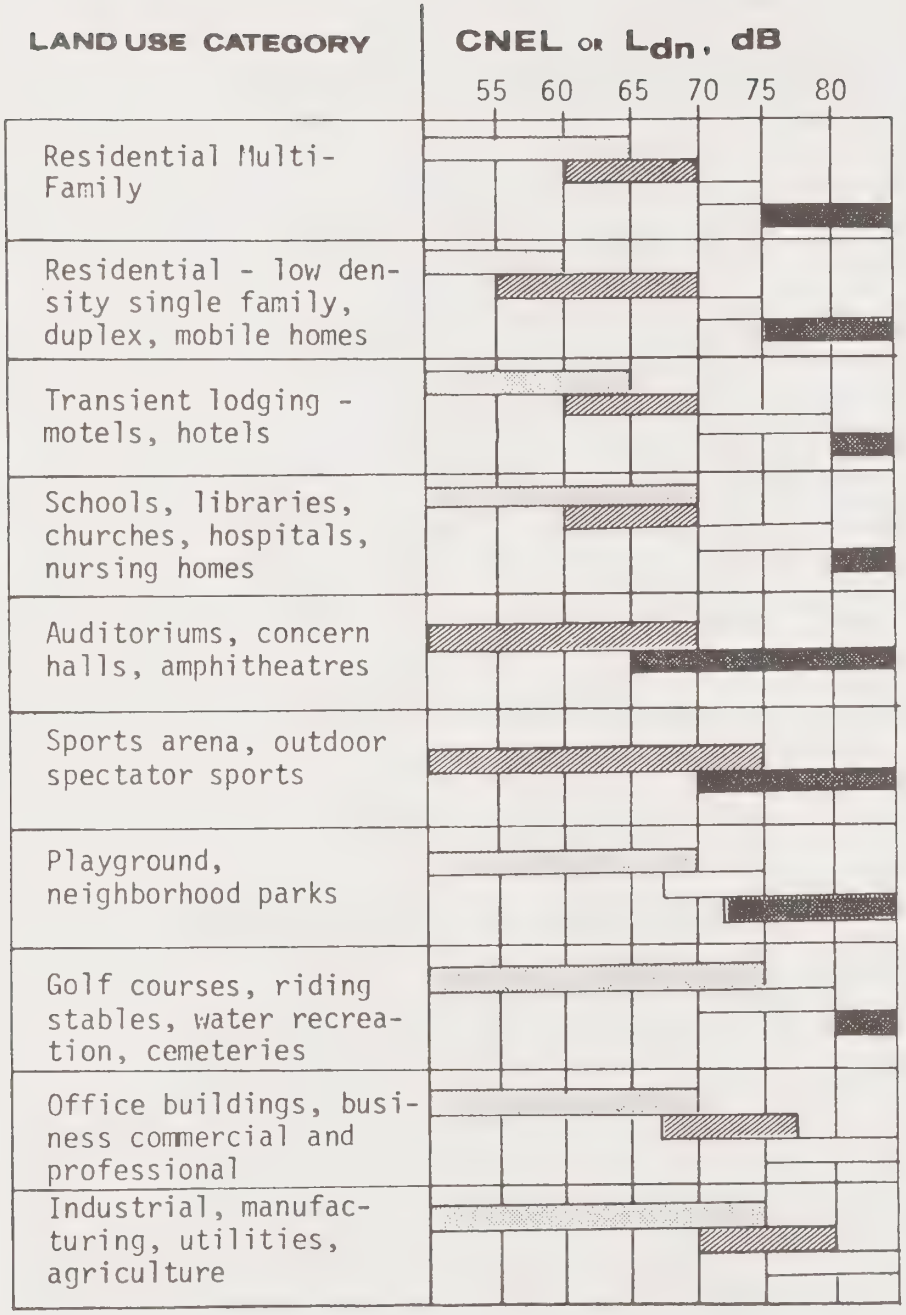
Figure 3 indicates the CNEL considered acceptable for various land use categories and may be used as a guideline for future planning. In general, exterior noise exposures at residential locations should not exceed a CNEL of 65 dB.

The Environmental Protection Agency (EPA) has recommended a policy stating that a CNEL of 55 dB should not be exceeded within exterior living spaces. However, the EPA emphasizes that this level of exposure may not be economically feasible nor, in many cases, a practical level to achieve.



SOURCE: In part taken from, "Information on Levels of Environmental Noise...", U.S. Environmental Protection Agency, 550/9-74-004, March 1974.

Figure 2 - Outdoor Noise Exposures at Various Locations



SOURCE: In part taken from "Aircraft Noise Impact Planning Guidelines for Local Agencies", U.S. Dept. of Housing and Urban Development, TE/NA-472, November 1972.

Figure 3 - Land Use Compatibility for Community Noise Environments

Acceptable Interior Noise Exposures - CNEL

California's noise insulation standards were officially adopted by the California Commission of Housing and Community Development in 1974 and became effective on August 22, 1974 (California Administrative Code, Title 24). The ruling states that the "...interior community noise equivalent level (CNEL) with windows closed, attributable to exterior sources, shall not exceed an annual CNEL of 45 dB in any habitable room." Additionally, the commission specifies that residential buildings or structures to be located within exterior CNEL contours of 60 dB or greater of an existing or adopted freeway, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source shall require an acoustical analysis showing that the building has been designed to limit intruding noise to an interior CNEL of 45 dB.

Annoyance and Health Considerations

In general, noise may affect the average individual in the following ways:

1. General hearing loss or damage. Sound levels which exceed 85 dB(A), when experienced for long durations during each working day, may result in severe temporary or even permanent hearing loss. State and federal safety and health regulations currently protect workers at levels of exposure which exceed 90 dB(A) for each 8-hour workday.

2. Interference with oral communication. Speech intelligibility is impaired when sound levels exceed 60 dB(A). The amount of interference increases with sound level and distance between speaker and listener.

3. Sleep interference. Sound levels which exceed 40 to 45 dB(A) are generally considered to be excessive for sleeping areas within a residence.

4. Contributes to nervousness and tension. Human response to frequent noises loud enough to startle or alarm has been linked to such chronic stress symptoms as low resistance, high blood pressure, exhaustion, and ulcers.

FINDINGS

The most significant noise producing activity within the City of Bakersfield involves the transportation elements (arterials, freeways, rail lines, and aircraft flyovers). In addition, numerous fixed sources of noise exist within portions of the city. The following section provides a discussion of the noise measurements obtained and an inventory of noise sources within the city. Noise exposure contours have also been derived for the city and noise impact areas have been identified.

Noise Survey Results

Various locations within the City of Bakersfield were surveyed in December, 1982 to establish the existing levels of noise. These measurement sites were selected to determine the impact on noise sensitive areas due to traffic on major arterials, freeways, and highways, as well as activity on the railways and at the airports. A total of 82 measurements were obtained. The measurement locations and the sound levels measured at each position are listed in Appendix IV and provide a definition of the overall existing noise environment of the City of Bakersfield. It should be noted that the sound level at any location varies greatly during the day as traffic volumes fluctuate. Therefore, the results of the measurements are not necessarily indicative of long-term average daily noise exposures at the measurement positions and have not been used in the preparation of the CNEL contour maps. In addition to the above, measurements were taken at several schools throughout the city. These schools and the measurements obtained at each location are also identified in Appendix IV.

The following provides an inventory of noise sources measured within Bakersfield and the ranges of maximum sound levels generated by these sources:

Noise Source	Range of Sound Levels
Light Aircraft Flyover (Alt. 2000')	65 to 75 dB(A)
Truck Leaving Plant on Private Property at 50'	72 to 80 dB(A)
Trash Pickup at 100'	75 to 95 dB(A)
Helicopter Flyover (Alt. 200')	85 to 95 dB(A)
Truck on City Streets at 50'	75 to 90 dB(A)
Transit Bus at 50'	71 to 75 dB(A)
Motorcycles at 50'	65 to 90 dB(A)
Sports Cars at 50'	65 to 85 dB(A)
Traffic on Main Arterials at 50'	65 to 75 dB(A)
Traffic on Freeway at 50'	80 to 85 dB(A)
Construction Noise at 50'	Refer to Figure 4
Train Horn Sound, Level vs. Distance	Refer to Figure 5
Locomotive Passby at 50'	84 to 86 dB(A)

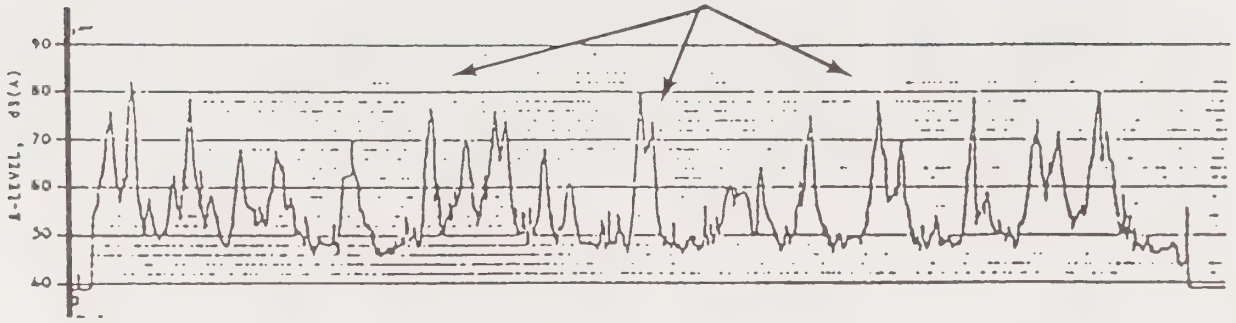
When the sound level of a noise is indicated, the distance from source to receiver must be stated.

These noise sources were measured at various locations throughout the city. Therefore, the sound levels are not necessarily indicative of any particular area or location.

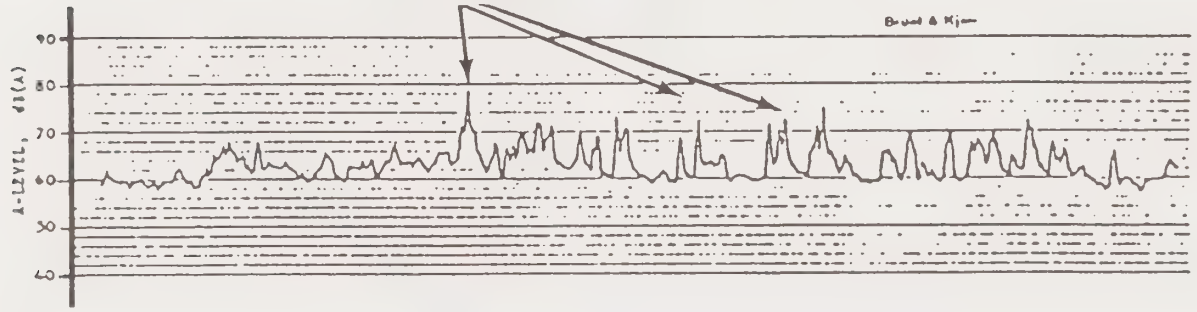
Community Noise Equivalent Level (CNEL) Contours

CNEL contours have been derived for each of the noise producing transportation elements within Bakersfield (Figures 6 and 7). They have been prepared on city street maps using a scale of 1" = 1,200' and on aerial photographs having a scale 1' = 400'. The procedures used to derive the arterial noise contours essentially rely on research studies reported by the Federal Highway

Truck and Front Loader at Construction Site



Trucks (6-axle) on Highway Leaving Construction Site

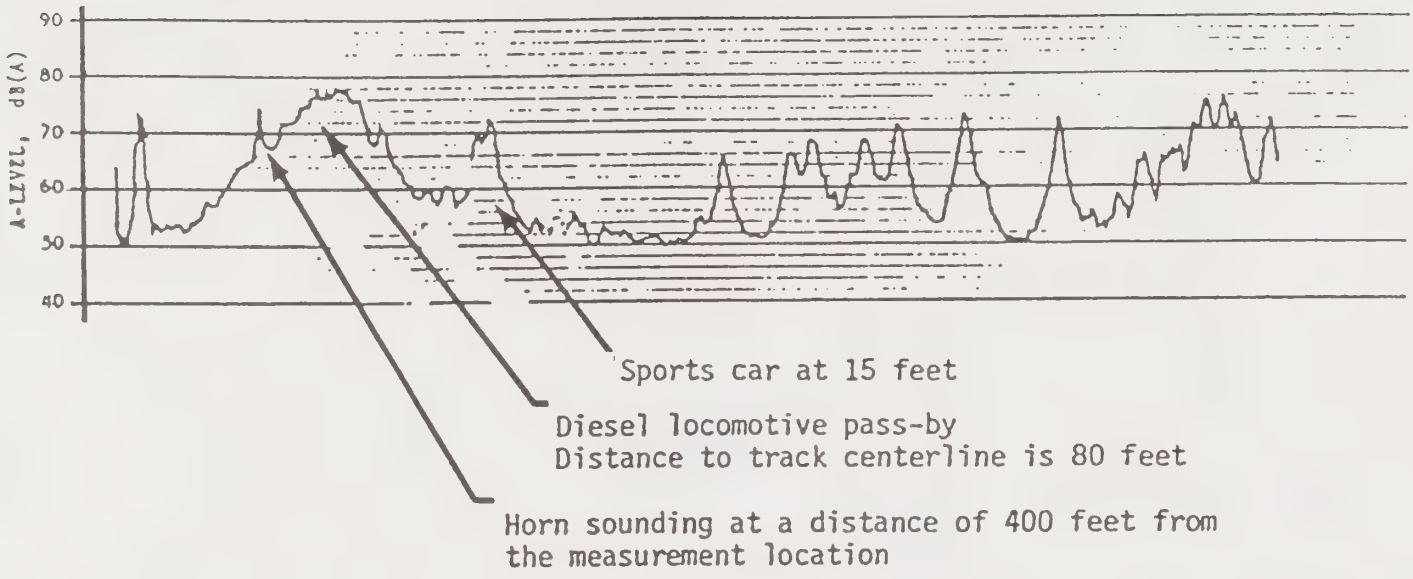


CONSTRUCTION EQUIPMENT NOISE LEVELS

(measured at a distance of 50 feet)

Equipment	Noise Level	Equipment	Noise Level
Earthmoving		Stationary	
front loader	79 dB(A)	pump	76 dB(A)
backhoe	85	generator	76
bulldozer	80	compressor	81
tractor	80	Impact	
scraper	88	pile driver	101
grader	85	jack hammer	88
truck	91	rock drill	98
paver	89	pneumatic tools	86
Materials Handling		Other	
concrete mixer	85	saw	78
concrete pump	82	vibrator	76
crane	83		
derrick	88		

Figure 4 - Typical Construction Noise Levels



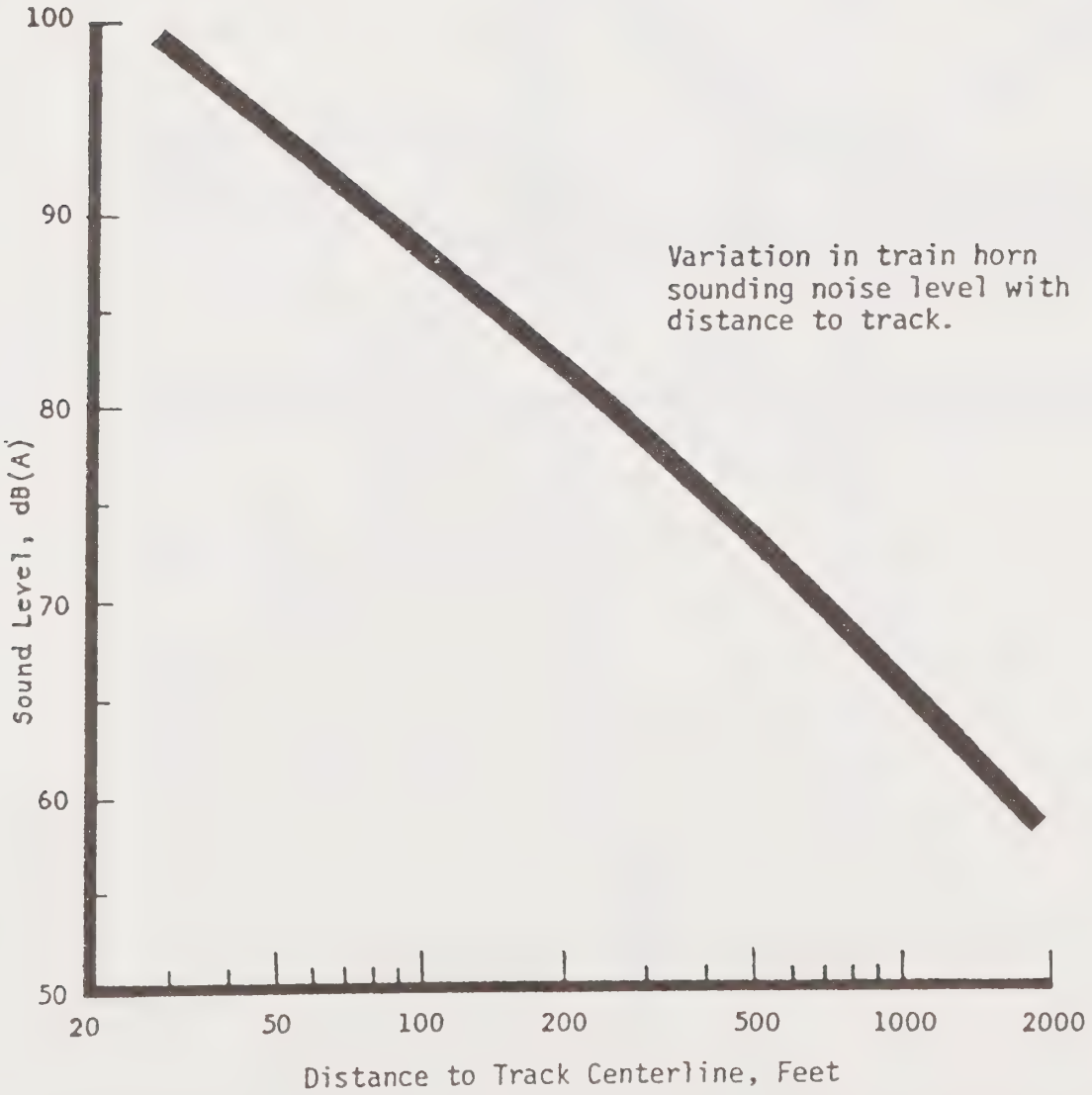


Figure 5 - Train Noise and Train Horn Sounding Level

Refer to 1200 scale maps and 400 scale aerial photographs in the Planning Department for more detailed noise contour lines.

Blackened areas are areas located within the 65 dB CNEL contour lines

Figure 6. Existing (1983) Noise Impact Areas (CNEL greater than 65 dB).

Refer to 1200 scale maps and 400 scale aerial photographs in the Planning Department for more detailed noise contour lines.

Blackened areas indicate areas within the 65 dB CNEL contour lines.

Figure 7. Projected (2000) Noise Impact Areas (CNEL greater than 65 dB)

Administration (Reference 6). The data used in the contour analysis (average daily traffic volumes, truck mix, traffic speed, and arterial grade) were provided by city, county, and state sources. Contours are provided for CNEL values from 60 to 80 dB in 5 dB increments for the existing (Figure 6) and projected, year 2000 (Figure 7), environments within the city. All CNEL contour maps are on file in the City of Bakersfield Planning Department.

A significant portion of the noise experienced in the city is produced by traffic on the freeways, highways, and the primary and secondary arterials. Each of these arterials has been considered in the development of the CNEL contours. Also considered in the development of the contours were aircraft operations at Meadows Field, Rio Bravo Airport, and the Bakersfield Airpark, as well as operations on the Southern Pacific and AT & SF rail lines. For the purposes of this study, the rail line contours were developed using the train activity data supplied by the two rail companies. Also, the airport contours for Meadows Field were developed by Wilbur Smith and Associates, Inc. (Reference 9). The contours for Rio Bravo Airport were prepared by Brown-Buntin Associates (Reference 10). Contours for the Bakersfield Airpark are based upon measurements of aircraft noise exposures in the vicinity of the airport as well as operational data provided by Mr. Bill Lewis, airport manager.

Freeway and Highway Traffic Noise

CNEL values at some residential locations bordering the Route 58, Route 99, Route 178, Route 184, and Route 204 Freeways and highways are projected to be in the range of 65 to 85 dB. This range of levels is greater than is considered acceptable and will compromise the welfare of residents exposed for a long period of time. (Refer to Appendix III for a discussion of the effects of noise on people.)

Traffic Noise from Major and Secondary Arterials

The CNEL values at residential locations directly adjacent to most of the major and secondary arterials within the city currently exceed 65 dB. Hence, the noise exposure at these residential locations is excessive. By the year 2000 it is estimated that the CNEL at residential locations adjacent to all the reaches of existing and proposed arterials within the City of Bakersfield will exceed 65 dB (refer to Table V-1).

Aircraft Noise From Bakersfield Airpark

At the current level of aircraft activity, the impact of flight operations at Bakersfield Airpark is insignificant at existing residential locations in the south-central portion of the city in the vicinity of the Airpark. However, because the flight tracks extend over a significant portion of the city there are few areas that are not affected by these operations.

Currently, there are approximately 65,335 flight operations per year at the Bakersfield Airpark (about 179 per day). By the year 2000 this is expected to increase to the maximum operating capability of the present facility: approximately 83,220 operations per year (about 228 per day). As Figure 7 indicates, this will

result in a significant impact at some residential locations near the Airpark. However, the future impact will be directly related to the number of operations occurring each day and the time of day at which they occur. A significant increase in nighttime operations will have a detrimental effect on the quality of life within the city.

It should be noted that the significant impact generated by operations at the Airpark is primarily a result of cropduster activity during the early morning hours. This impact can be reduced significantly by restricting cropduster operations to daytime hours and/or requiring takeoffs to the south (Runway 13). Appropriate land use planning will also minimize the number of residences exposed to excessive levels of noise.

Aircraft Noise from Meadows Field Airport

An insignificant impact is projected for the northern portions of the city due to flight operations at Meadows Field Airport. However, most portions of the city are affected by this activity due to the location of the flight tracks and the number and types of aircraft involved. A significant increase in nighttime operations or takeoffs to the south will have a detrimental effect on the quality of life within the city.

Aircraft Noise from Rio Bravo Airport

Currently, there are approximately 7300 operations per year at Rio Bravo Airport (about 20 per day). This is expected to increase to about 36,500 per year by 1996 (about 100 per day). However, a significant impact is not projected for residential locations in the vicinity of the airport due to the fact that only general aviation aircraft are involved. Also, the city has proposed restrictions for the runway length, takeoff weight, and

peak noise levels permitted at the airport. These measures will serve to minimize the impact of noise at adjacent residential locations.

Noise From Train Movements On The AT & SF Rail Line

At the current level of activity, the impact of Santa Fe rail line operations is considered significant at existing residential locations in the central portion of the city.

Currently, there are approximately 35 operations per day on the Santa Fe rail line (data supplied by the AT & SF Railway Company). This level of activity is not expected to increase significantly by the year 2000. However, any future impact will be directly related not only to the number of operations occurring each day, but also to the time of day at which they occur. A significant increase in nighttime operations will have a detrimental effect on the quality of life in Bakersfield. Late night and early morning train passes are the primary source of annoyance to residents living directly adjacent to the tracks.

Noise From Train Movements on the Southern Pacific Rail Line

The impact of operations from the Southern Pacific Rail line is considered significant at all residential locations in proximity to the tracks. Currently, there are approximately 12 operations per day on the line north of the Southern Pacific railyard. South of the railyard, the line is shared with the AT & SF Railway Company and generates about 47 operations per day.

The total number of operations on the Southern Pacific rail line is not expected to change significantly in the future. However, as indicated above, the impact of railway operations is not only determined by the number of train passes, but also by the time at

which they occur. Therefore, an increase in nighttime operations will have a detrimental effect on the quality of life for people living in the vicinity of the tracks.

Noise From The Mesa Marin Raceway

Because of the limited activity at the raceway, its contribution to the overall CNEL at the adjacent residentially zoned property is negligible. However, measurements obtained on May 7, 1983 indicate that peak sound levels of 83 dB(A) are being generated at the residential property line west of the raceway. This area is partially buffered from the noise by an embankment that surrounds the western portion of the speedway. At the residential property line southeast of the raceway (across Route 184), noise levels exceeding 90 dB(A) were measured. This location has direct line-of-sight to the race track and the grandstands. Annoyance may occur at the nearest residential zoning when these properties are developed. Mitigation of this potential adverse impact is needed when development occurs.

Noise From Activity At The Lake Ming Boat Races

Drag boat racing at Lake Ming does not contribute significantly to the overall CNEL at adjacent residential locations due to the infrequent nature of the activity. However, peak noise levels of up to 96 dB(A) were measured at residential properties with direct line-of-sight to the racing activity. Early morning racing activity, engine run-ups, etc., are the primary source of annoyance to nearby residents.

Commercial/Industrial Noise

In general, commercial/industrial noise within the City of Bakersfield is not considered excessive. However, where residential locations are adjacent to heavy industrial zones or trucking operations, a significant impact exists. This impact is primarily related to noise generated by loading dock operations, trucks entering and leaving the area, and mechanical equipment located outside the building(s).

Construction Activity

The impact of construction activity noise which occurs during the daytime is considered minimal for no more than two or three months of activity. However, late night and weekend disturbance caused by construction noise may cause a significant impact when experienced at nearby residential locations.

Noise Sensitive Locations

In general, the sound levels at noise sensitive locations within the Bakersfield metropolitan area are not considered excessive. However, all or part of the following areas are located within a 65 dB CNEL contour as identified on the maps of Figures 6 and 7:

Kern Medical Center

Mercy Hospital

San Joaquin Community Hospital

Bakersfield Convalescent Hospital

Colonial Convalescent Hospital

Hilltop Convalescent Hospital

Parkview-Julian Convalescent Hospital

E. Bakersfield High School

Foothill High School*

Bakersfield College (proj.)

Bakersfield College, Downtown Center

Bakersfield Apostolic Faith Acadamy

Bakersfield Assoc. for Retarded Citizens

Rosewood Health Facilty-Nursing Home

Shady Manor Convalescent Hospital

Beale Memorial Library-Main Branch

Holloway-Gonzales Library

Northeast Branch Library (proj.)

Southwest Branch Library

Casa Loma School (proj.)

College Heights School

Compton Jr. High School

Franklin School

Jefferson School

Longfellow School

Horace Mann School

Millie Gardette Munsey School

Myra A. Nobel School*

Sierra Jr. High School

Marsa Voorhies School

Washington Jr. High School*

Wayside School

Williams School*

Plantation School (proj.)

Laurel Glen School
(depending on location)

Bakersfield Adult School

Bakersfield High School

Bethel Apostolic Academy

Bethel Christian School

East Hills Christian School

Friends School

Garces Memorial High School

Heritage Acadamy

Junesters School of Achievement

Our Lady of Guadalupe Elementary School

Our Lady of Perpetual Help Elementary School

Saint Francis School

Saint Phillip's School

Stockdale Christian Elementary School

Sunrise Christian School

Bakersfield Beach Park

California Park

Casa Loma Park

Heritage Park

Jastro Park

Jefferson Park

Metropolitan Recreation Center

Panorama Park

Patriots Park

Planz Park

Sanders Park

Bakersfield Christian School (proj.)	Wayside Park

*Portions of playground area are within existing or projected 65 CNEL contour.

Consideration should be given to the impact on classroom noise levels when constructing future schools adjacent to major arterials, freeways, railroads, or airports. Section 216 of the State of California Streets and Highways Code indicates that interior sound levels for schoolrooms adjacent to a freeway or State highway may not exceed 50 dB(A). This standard is interpreted to mean that the upper 30% of maximum noise levels that are measured within a classroom may not exceed 50 dB(A). It is also generally applied to other sources of noise which may intrude on schoolroom spaces such as busy arterials, rail lines, etc. Measures which would mitigate noise to acceptable levels include installing sound rated windows and/or keeping windows closed (this requires air conditioning to provide a habitable environment), or constructing a noise barrier between the classrooms and the arterial.

Number Of People Affected By Noise

Using the existing (1983) CNEL contour maps, zoning maps, and appropriate census data, the number of people exposed to various levels of noise was determined. This was then further reduced to obtain the approximate number of people exposed to noise generated by various sources within the city (arterial noise, freeway noise, aircraft noise, rail line noise, etc.). It is noted that a greater number of people are currently exposed to noise from the major and secondary arterials within the city than from any other source. It is also noted that about 15% of the current population of Bakersfield are exposed to a CNEL of 60 dB or more.

A complete listing of the analysis is provided in Table 1. Table 2 provides the analysis for the projected (2000) case based on estimated population density figures for the city. A comparison of these two tables indicates that the impact due to traffic on the freeways and arterials is projected to increase significantly by the year 2000. This is primarily due to marked increases in traffic volumes (up to 700% on some arterials).

Table 1. Approximate Number of People Exposed to Various Levels of Noise and Various Sources of Noise Within the Bakersfield Metropolitan Area, Existing (1983)*

Range of CNEL	Major and Secondary Arterials	Freeways	Railroads	Airports	Lower Levels of Aircraft, Arterial and/or RR Noise	Total Number of People Exposed to Various Levels of Noise	Percent of Total
Less than 60 dB	-------	-----	-----	---	157,150	157,150	85%
60 - 65	12,410	4,850	1,940	400	-------	19,600	11%
65 - 70	4,800	1,600	1,210	0	-------	7,610	4%
70 - 75	710	140	80	0	-------	930	<1%
75 - 80	0	70	80	0	-------	150	<1%
80 - 85	0	0	0	0	-------	0	0
Total Number of People Exposed to Various Sources of Noise	17,920	6,660	3,310	400	157,510	185,440	100%
Percent of Total	10%	3%	2%	<1%	85%	100%	

*Based on population densities of 2.9 people per single family unit and 2.0 people per multifamily unit.

Table 2. Approximate Number of People Exposed to Various Levels of Noise and Various Sources of Noise Within the Bakersfield Metropolitan Area, Projected (2000)*

Range of CNEL	Major and Secondary Arterials	Freeways	Railroads	Airports	Lower Levels of Aircraft, Arterial and/or RR Noise	Total Number People Exposed to Various Levels of Noise	Percent of Total
Less than 60 dB	-------	-----	-----	-----	197,450	197,450	74%
60 - 65	24,570	9,010	2,380	2,790	-------	38,750	15%
65 - 70	13,890	6,780	1,210	90	-------	21,970	8%
70 - 75	5,190	2,790	250	0	-------	8,230	3%
75 - 80	70	310	80	0	-------	460	<1%
80 - 85	0	140	0	0	-------	140	<1%
Total Number of People Exposed to Various Sources of Noise	43,720	19,030	3,920	2,880	197,450	267,000	100%
Percent of Total	16%	7%	2%	1%	74%	100%	

*Based on population densities of 2.9 people per single family unit and 2.0 people per multifamily unit.

PROBLEM SUMMARY

In the City of Bakersfield there are five major sources of noise:

1. Traffic on the Route 58, Route 99, Route 178, Route 184, and Route 204 Freeways.

2. Traffic on the major arterials within the city.

3. Rail traffic on the Southern Pacific and AT & SF rail lines.

4. Operations at the Bakersfield Airpark, Meadows Field, and Rio Bravo Airport.

5. Commercial/industrial activities adjacent to residential locations.

Of these, the greatest exposures experienced by residents involve the noise produced by traffic on the freeways where a CNEL of 65 to 85 dB exists at some residential locations. This compromises the welfare of citizens in these areas. Priority should be given by the city to correcting this problem.

The Noise Element has identified a number of noise impacted locations within the city. The Policy Program consists of policies and implementation techniques which will minimize noise at these locations as residential development continues. Short-term possibilities for noise reduction in Bakersfield consist mostly of the enforcement of noise control guidelines and the appropriate placement of walls and berms to buffer residential and other noise sensitive areas from traffic and rail way noise. Long-term possibilities for noise reduction will be contingent upon future development, especially along major traffic routes and in the vicinity of the railroads and the airports. Planning now can help to minimize the future impact of noise on the community.

POLICY PROGRAM

POLICY 1 - NOISE BARRIERS OR OTHER NOISE MITIGATION TECHNIQUES WILL BE REQUIRED IN NEW SUBDIVISIONS IF DEVELOPED ALONG STATE HIGHWAYS, CITY STREETS, OR RAILROADS WHERE A SIGNIFICANT IMPACT EXISTS OR IS PROJECTED AT NEARBY NOISE-SENSITIVE LOCATIONS.

Action - The city will review proposed subdivision tracts, parcel maps and site plans involving residential development with respect to noise impacts and require noise barriers or alternative sound attenuation to reduce the interior and exterior CNEL to 45 dB and 65 dB, respectively. (Refer to Policies 8 and 9 for a discussion of interior and exterior noise exposure standards.)

Discussion - Actual noise barriers 10 to 12 feet in height may be required to reduce noise to acceptable levels. It will be the developer's responsibility to secure any property required for construction of such walls. Other methods to reduce noise impacts to future residents may be substituted, such as increased setbacks, site, layout, and building design.

Responsibility - Planning and Public Works Departments, CalTrans, and the Southern Pacific and AT & SF Railway companies.

POLICY 2 - NOISE BARRIER CONSTRUCTION ALONG STATE HIGHWAYS WILL BE PURSUED WHERE A SIGNIFICANT IMPACT EXISTS OR IS PROJECTED AT NEARBY RESIDENTIAL ZONES AND OTHER NOISE SENSITIVE LOCATIONS.

Action - The city will actively encourage the State of California to finance the construction of noise barriers or develop other noise mitigation strategies to reduce noise impacts on adversely impacted areas.

Discussion - Residential locations directly adjacent to the freeways are exposed to a CNEL in the range of 65 to 85 dB(A) during portions of the day. Noise barrier heights from 10 to 12 feet are needed at these locations to reduce the noise to acceptable levels. Such construction requires the approval, cooperation, and financing by the State of California.

Responsibility - Public Works Department liaison with City Council requests to the State of California.

POLICY 3 - NOISE BARRIER CONSTRUCTION WILL BE PURSUED ALONG THE AT & SF AND SOUTHERN PACIFIC RAIL LINE CORRIDORS WHERE RESIDENTIAL ZONES EXIST ADJACENT TO THE MAIN TRACKS AND SWITCHING YARDS.

Action - The city will encourage the construction of noise barriers in residential areas where existing homes are directly adjacent to the main tracks and switching yards. Railroads will be encouraged to actively participate only in the planning, approval and coordination of such efforts.

Discussion - Residential locations directly adjacent to the rail lines are exposed to peak noise levels in the range of 80 to 85 dB(A) during train passes. The construction of noise barriers with heights of 13 to 15 feet should be considered as a noise reduction measure. Construction of a sound barrier must be as close as possible to the track in order to be effective and economically feasible. This requires the actual construction of the barrier on the rail line right-of-way which is under the management of the railway companies. Such construction requires the approval, cooperation, and coordination of the AT & SF and Southern Pacific Railway Companies.

Responsibility - Public Works and Planning Department liasion with City Council requests to major railroads.

POLICY 4 - THE CITY WILL ENCOURAGE THE AT & SF AND SOUTHERN PACIFIC RAILWAYS TO REDUCE THE LEVEL OF NOISE PRODUCED BY TRAIN MOVEMENTS WITHIN THE CITY.

Action - The city will encourage the AT & SF and Southern Pacific railway companies to minimize the level of noise produced by existing train movements. This can be accomplished by regular maintenance of the track and trains. The city will also monitor the existing operations on the rail lines as well as any plans for future development. Any projects which result in increased noise exposures at residential areas without mitigation from train noise will be discouraged.

Responsibility - Public Works and Planning Department in cooperation with the AT & SF and Southern Pacific Railway Companies.

POLICY 5 - THE CITY WILL ENCOURAGE THE IMPLEMENTATION OF NOISE CONTROL PROCEDURES AT THE BAKERSFIELD AIRPARK AND WILL CONSIDER METHODS BY WHICH NOISE EXPOSURE DUE TO AIRCRAFT FLYOVERS MAY BE MINIMIZED WITHIN THE CITY.

Action - The city will monitor the number of existing operations at Bakersfield Airpark and any plans for future development. Any actions that increase the level of noise throughout the city will be discouraged.

Discussion - State Airport Noise Regulations require that local airport proprietors, operators, local communities, counties and the State work together to reduce and prevent airport noise problems. Title 21, Section 5012 of the California Administrative Code indicates that, after giving due consideration to economic and technological feasibility, the maximum community noise equivalent level (CNEL) generated by the flight operations when experienced at residential locations should not exceed 65 dB after December 31, 1985. (A maximum CNEL of 70 dB is permitted prior to

this date.) The City of Bakersfield permit review process for modifications and expansions, including the environmental review process, will incorporate the operational noise abatement methods, appropriate to the project, cited in the "Bakersfield Airpark Expansion Draft Environmental Impact Report" prepared by the City of Bakersfield (August 1980) or other mitigation measures necessary to achieve compliance with the 65 dB standard.

Responsibility - Bakersfield Airpark and Development Services Department

POLICY 6 - WHEN APPROPRIATE, THE CITY WILL PARTICIPATE IN THE PLANNING FOR DEVELOPMENT AT MEADOWS FIELD WITH RESPECT TO PROBABLE NOISE IMPACTS.

Action - Any proposed actions that would increase the level of noise throughout the city will be closely reviewed for mitigation. This includes increased flight operations and flight paths that pass over the city.

Discussion - The City Council of the City of Bakersfield has representation on the Intergovernmental Relations committee and the Kern County Council of Governments (Kern COG) which also operates as the Airport Land Use Commission (ALUC). The city's participation on these regional transportation and planning agencies will encourage compatible development of Meadows Field consistent with State noise standards.

Responsibility - Planning Department, City Council, County of Kern and Kern COG.

POLICY 7 - THE CITY WILL ENCOURAGE THE IMPLEMENTATION OF NOISE CONTROL PROCEDURES BY THE RIO BRAVO AIRPORT AND WILL CONSIDER METHODS BY WHICH NOISE EXPOSURE DUE TO AIRCRAFT FLYOVERS MAY BE MINIMIZED WITHIN THE CITY.

Action - The city will review any plans for future development of the Rio Bravo Airport. Any actions that increase the level of noise throughout the adjacent area beyond the presently defined projected 1996 noise impact boundary identified in the conditional use permit for the airport will not be permitted. This includes increased flight operations and flight paths that pass over residential areas. The city will require the following operational noise abatement methods:

1. No aircraft over 12,500 pounds may use the facility.

2. The operational length of the runway shall be limited to 3,000 feet.

3. No aircraft producing single event noise levels in excess of 75 dB(A), as defined in FAA Advisory Circular 36-3A (Reference 6), shall use the facility.

The above are intended to maintain CNEL noise within the noise impact boundaries projected for 1996.

Responsibility - Planning Department in cooperation with the Manager of Rio Bravo Airport.

POLICY 8 - THE CITY WILL ADDRESS NOISE CONTROL IN THE REVIEW OF THE EXTERIOR LIVING SPACE OF ALL NEW RESIDENTIAL DEVELOPMENTS WITHIN NOISE IMPACT AREAS.

Action - The city will adopt guidelines which consider noise as an early factor in planning future residential developments.

Discussion - Portions of the city are significantly affected by noise as shown on the noise contour maps. The more affected areas include the freeway corridors, as well as portions of areas adjacent to the AT & SF and Southern Pacific rail lines and the Bakersfield Airpark.

A noise control procedure (Appendix VI) may be used in place of an acoustical analysis to establish standards of insulation against noise for areas in the vicinity of arterials, railroads and airports where the exterior CNEL exceeds 60 dB except where an acoustical analysis shall be required. An acoustical analysis shall be required for residential developments not covered by the procedure (Section 6.4) and for all multifamily developments consistent with requirements of the State of California Noise Insulation Standards (CAL ADM CODE: Title 24). The analysis or procedure used shall indicate the existing and projected CNELs on the site and the method(s) by which the noise is to be controlled or reduced to no more than 65 dB within the exterior living space of the project throughout the planning period. For single family homes, this is defined to be the rear yard area; for multifamily units, the exterior living space is generally considered to be patios, balconies and any common recreation areas (e.g. a pool yard).

Noise should be considered early in the development of new residential or noise sensitive construction. The location and orientation of the residential buildings may be configured to minimize or eliminate a noise problem for a site adjacent to the freeway, major highways, or rail lines. Other effective noise reduction tools include the use of earthen berms, sound reducing walls, and generous setbacks from noise sources.

Responsibility - City Staff and Planning Commission.

POLICY 9 - THE CITY WILL REQUIRE NOISE CONTROL FOR THE INTERIOR LIVING SPACE OF ALL NEW RESIDENTIAL DEVELOPMENTS WITHIN NOISE IMPACT AREAS.

Action - The city will require that the State Noise Insulation Standards for exterior-to-interior noise control be applied to all new single and multifamily structures.

Discussion - As stated earlier in the Noise Element, these standards were adopted by the State in 1974. They apply to all new multifamily dwelling units (apartments, condominiums, motels, etc.). The exterior-to-interior noise control requirements of the Standards should also be applied to all new single family structures.

The residential design should be such that the interior living spaces are exposed to a CNEL of no more than 45 dB. This may be accomplished by:

1. A reduction of the exterior noise to which the dwelling is exposed.

2. Installing sound rated windows suitable for the noise reduction required.

3. Configuring and insulating exterior walls and roofing systems to reduce the interior noise to acceptable levels.

4. Locating (or eliminating) vents, mail slots, etc., to minimize sound propagation into the home.

5. Installing forced air ventilation as needed to provide a habitable living space if the interior CNEL is to be met with all or some windows closed.

A noise control procedure (Appendix VI) may be used in place of an acoustical analysis to establish standards of isolation against noise for areas in the vicinity of arterials, railroads and airports where the exterior CNEL exceeds 60 dB except where an acoustical analysis shall be required. An acoustical analysis shall be required for all exclusions to the procedure (Section 6.4) and for all multi-family developments consistent with the requirements of California Administrative Code Title 24. The procedure requires specific noise level reduction as outlined above in noise impact areas to achieve an acceptable 45 dB (CNEL) interior noise level.

Responsibility - Building Department.

POLICY 10 - THE CITY WILL APPLY NOISE INSULATION REQUIREMENTS FOR THE CONVERSION OF EXISTING APARTMENTS INTO CONDOMINIUMS.

Action - The city will adopt the State Noise Insulation Standards to limit intrusive noise levels for all new condominium conversion projects within the city.

Discussion - As stated earlier in the Noise Element, the State Noise Insulation Standards apply to all new multifamily dwelling units. The city should also consider applying these standards to all new projects that involve the conversion of existing apartments into condominiums. These standards limit intrusive noise by setting minimum ratings for the sound transmission of party walls and floor/ceiling separations between units. The rating of these assemblies should be determined by field sound transmission loss testing per American Society for Testing and Materials (ASTM) Designations E90-75, E413-73, E336-77, and E492-77.

In addition, the Noise Insulation Standards specify a maximum interior noise exposure of 45 dB CNEL. This level may be accomplished as indicated in Policy 9. As stated in the Noise Insulation Standards, an analysis should be required for conversion projects within the 60 dB contour of freeways, highways, secondary arterials, airports, and rail lines within a community. This analysis should indicate the existing and projected CNELs on the site and the method(s) by which the noise is to be controlled or reduced so that the CNEL of the interior living spaces of the project do not exceed 45 dB.

Responsibility - City Staff and Development Services Department.

POLICY 11 - THE CITY WILL CONSIDER NOISE CONTROL REQUIREMENTS FOR ALL NEW EQUIPMENT PURCHASES.

Action - Noise levels produced by equipment will be considered a factor in the procurement process.

Discussion - Various city departments may be involved in the procurement of noise producing equipment such as compressors, air conditioners, and other fixed and mobile machinery. These types of operating equipment may be purchased with the necessary noise abating equipment installed.

Responsibility - Finance and Public Works Departments.

POLICY 12 - THE CITY WILL REVIEW EXISTING AND PROPOSED PROJECTS LOCATED NEAR NOISE SENSITIVE USES WITH THE INTENT TO REDUCE UNNECESSARY NOISE.

Action - 1. Maintain liaison with transportation agencies such as CalTrans regarding the design and location of new facilities and the possible improvements to existing ones.

2. Consideration should be given to buffering noise-sensitive areas from noise generating land uses.

3. Noise monitoring within the city will be an ongoing process conducted by the appropriate departments. Additionally, a liaison will be developed between the city and the Kern County Health Department in order to obtain assistance in on-site measurements of noise levels.

4. Close attention should be given to the noise evaluation in environmental impact statements.

Discussion - As the existing and projected noise contours developed for the Noise Element indicate, traffic is a major source of noise in the city. However, these contours should not be considered adequate for specific site evaluations.

Responsibility - City Staff and County of Kern.

POLICY 13 - THE CITY WILL PLACE CONDITIONS OF APPROVAL ON ALL NEW RESIDENTIAL DEVELOPMENTS IN PROXIMITY TO EXISTING COMMERCIAL/INDUSTRIAL OPERATIONS, THE MESA MARIN RACEWAY, AND THE LAKE MING BOAT RACES TO CONTROL THE INTERIOR NOISE LEVELS WITHIN THE HOMES OR RESIDENTIAL UNITS.

Action - The city will place the following Conditions of Approval on all new residential developments in proximity to existing commercial/industrial operations (including the Mesa Marin Raceway and the Lake Ming boat races):

CONDITION 1 - NOISE INTRUSION INTO PROPOSED RESIDENTIAL PROPERTY FROM EXISTING COMMERCIAL/INDUSTRIAL OPERATIONS.

A. New residential developments in the general vicinity of an existing commercial/industrial operation, shall be designed in such a way that the interior noise level within any habitable room shall not exceed the following standards:

Time Period	Noise Level
7:00 a.m. - 10:00 p.m.	55 dB(A)
10:00 p.m. - 7:00 a.m.	45 dB(A)

B. In consideration of these noise standards, the new residential development shall be designed in such a way that the noise level, when measured within any residence in the general vicinity of the commercial/industrial operation, does not exceed:

1. The interior noise standard for a cumulative period of more than 5 minutes in any hour, or

2. The interior noise standard plus 5 dB(A) for a cumulative period of more than 1 minute in any hour, or

3. The interior noise standard plus 10 dB(A) for any period of time.

C. In the event that the ambient noise level exceeds either of the first two noise limit categories above, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under the category shall be increased to reflect the maximum noise level.

D. Each of the noise limits specified above shall be reduced by 5 dB(A) for impact or predominant tone noises, or for noises consisting of speech, such as would be generated by a paging system.

CONDITION 2 - ACOUSTICAL ENGINEERING REPORT.

The developer of the proposed residential project shall submit as part of the application for a building permit an acoustical engineering report prepared by an individual qualified in the field of acoustical engineering. The report shall indicate the means by which the developer proposes to comply with the provisions of Condition 1, above. It shall include noise measurement data, analysis, drawings, etc., sufficient to identify the sources of noise and methods of mitigation used to reduce the level of the noise to the standards specified in Condition 1, above.

CONDITION 3 - FIELD TEST.

Where a complaint as to non-compliance with Condition 1 requires a field test to resolve the complaint, the complainant shall post a bond or adequate funds, as determined by the city, in escrow for the cost of said testing. Such costs shall be chargeable to the complainant when such field tests show that compliance with the condition is present. If such tests show non-compliance, then such costs shall be borne by the developer.

CONDITION 4 - VIOLATION OF THE STANDARDS.

In the event of a violation of the standards of Condition 1, as determined by the field test of Condition 3, the developer shall be required to alter the project as needed to comply with the condition. A determination of a violation of these standards shall only be made by the City of Bakersfield based upon acoustical engineering field studies.

CONDITION 5 - RESPONSIBILITY OF OWNER.

Compliance with the conditions as stated above shall be the responsiblity of the developer and/or any subsequent owner of the property occupied by the residential project.

Discussion - The CNEL standard indicated in Policy 9 does not address the impact of sporadic and infrequent noise such as would be generated by commercial/industrial operations (including the Mesa Marin Raceway and the Lake Ming boat races). Rather, it's purpose is to control the intrusion of noise from arterials, airports, and railroads. Compliance with both the standards of Policy 9 and the Conditions of Approval indicated above will ensure a habitable environment within all new residential developments proposed in the City of Bakersfield.

Responsibility - Building Department.

POLICY 14 - THE CITY WILL PLACE CONDITIONS OF APPROVAL ON ALL NEW COMMERCIAL/INDUSTRIAL OPERATIONS IN PROXIMITY TO EXISTING OR PROPOSED RESIDENTIAL AREAS.

Action - The city will place the following Conditions of Approval on all new commercial/industrial operations in proximity to residentially zoned areas:

CONDITION 1 - NOISE INTRUSION INTO RESIDENTIAL PROPERTY FROM THE PROPOSED COMMERCIAL/INDUSTRIAL OPERATION.

A. The commercial/industrial activity shall not produce noise when experienced on residential property in the general vicinity of the activity that exceeds the following standards:

EXTERIOR NOISE STANDARDS

Time Period	Noise Level
7:00 a.m. - 10:00 p.m.	55 dB(A)
10:00 p.m. - 7:00 a.m.	50 dB(A)

B. In consideration of these exterior noise standards, the owner of the commercial/industrial operation shall not allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by the property owner when the foregoing causes the noise level when measured on any residential property in the general vicinity of the proposed commercial-industrial operation to exceed:

1. The noise standard for a cumulative period of more than 30 minutes in any hour, or

2. The noise standard plus 5 dB(A) for a cumulative period of more than 15 minutes in any hour, or

3. The noise standard plus 10 dB(A) for a cumulative period of more than 5 minutes in any hour, or

4. The noise standard plus 15 dB(A) for a cumulative period of more than 1 minute in any hour, or

5. The noise standard plus 20 dB(A) for any period of time.

C. In the event that the ambient noise level on the residential properties exceeds any of the first four noise limit categories above, the cumulative period applicable to the category shall be increased to reflect the ambient noise level.

In the event that the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under the category shall be increased to reflect the maximum ambient noise level.

D. Each of the noise limits specified above shall be reduced by 5 dB(A) for impact, or predominant tone noise or for noises consisting of speech such as would be generated by a paging system.

E. The commercial/industrial activity shall not produce noise when experienced within a residence in the general vicinity of the commercial/industrial operation that exceeds the following standards:

INTERIOR NOISE STANDARDS

Time Period	Noise Level
7:00 a.m. - 10:00 p.m.	55 dB(A)
10:00 p.m. - 7:00 a.m.	45 dB(A)

F. In consideration of these interior noise standards, the owner of the commercial/industrial operation shall not allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by the owner when the foregoing causes the noise level when measured within any residence in the general vicinity of the commercial/industrial operation to exceed:

1. The interior noise standard for a cumulative period of more than 5 minutes in any hour, or

2. The interior noise standard plus 5 dB(A) for a cumulative period of more than 1 minute in any hour, or

3. The interior noise standard plus 10 dB(A) for any period of time.

G. In the event that the ambient noise level exceeds either of the first two noise limit categories, above, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under the category shall be increased to reflect the maximum ambient noise level.

H. Each of the noise limits specified above shall be reduced by 5 dB(A) for impact or predominant tone noises, or for noises consisting of speech, such as would be generated by a paging system.

CONDITION 2 - ACOUSTICAL ENGINEERING REPORT.

The owner of the proposed commercial/industrial operation shall submit as part of the application for a building permit an acoustical engineering report prepared by an individual qualified in the field of acoustical engineering. The report shall indicate the means by which the developer proposes to comply with the provisions of Condition 1, above. It shall include noise measurement data, analysis, drawings, etc., sufficient to identify the sources of noise and methods of mitigation used to reduce the level of the noise to the standards specified in Condition 1, above.

CONDITION 3 - FIELD TEST.

Where a complaint as to non-compliance with Condition 1 requires a field test to resolve the complaint, the complainant shall post a bond or adequate funds, as determined by the city, in escrow for the cost of said testing. Such costs shall be chargeable to the complainant when such field tests show that compliance with

the condition is present. If such tests show non-compliance, then such costs shall be borne by the owner of the commercial-industrial operation.

CONDITION 4 - VIOLATION OF THE STANDARDS.

In the event of a violation of the standards of Condition 1, as determined by the field test of Condition 3, the owner of the commercial/industrial operation shall be required to alter the configuration and/or activity as needed to comply with the condition. A determination of a violation of these standards shall only be made by the City of Bakersfield based upon acoustical engineering field studies.

CONDITION 5 - RESPONSIBILITY OF OWNER.

Compliance with the conditions as stated above shall be the responsiblity of the owner of the commercial/industrial operations and/or any subsequent owner of the property occupied by the commercial/industrial operation.

Discussion - Currently, no standards exist for controlling the impact of noise generated by sporadic sources, such as exist at commercial/industrial operations. Compliance with the above conditions of approval will require commercial/industrial operations to be designed in such a way as to minimize their impact on nearby residential locations.

Responsibility - Building Department.

APPENDICES

I. References

II. Definitions

III. Effects of Noise on People

IV. Noise Measurement Sites and Analysis of the Data

V. Traffic Analysis and Community Noise Equivalent Level, (CNEL) Data for Major and Secondary Arterials

VI. Noise Control Procedures for Residential Construction is available as a separate attachment

VII. Environmental Assessment for the Noise Element

VIII. Consistency with the General Plan

APPENDIX I

REFERENCES

References

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2. "A Study of the Magnitude of Transportation Noise Generation and Potential Abatement", U.S. Department of Transportation (a set of seven reports), 1970.

3. "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances", U.S. Environmental Protection Agency, Report P.B. 206 717 (National Technical Information Service No. NTIS 300.1), 1971.

4. "Industrial Noise Manual", American Industrial Hygiene Association (14125 Prevost Street, Detroit, Michigan 48227), 1966.

5. "Noise Control in Multifamily Dwellings", U.S. Department of Housing and Urban Development (supercedes FHA No. 750), 1963.

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9. 1980 and 1986 CNEL Noise Contour Maps for Meadows Field Airport, prepared by Wilbur Smith and Associates, Inc.

10. "Noise Impact Study for an Amended Conditional Use Permit, Rio Bravo Airport, Bakersfield, California", Brown-Buntin Associates, December 1982.

APPENDIX II

DEFINITIONS

Definitions

The following common terms are used throughout the Noise Element:

Ambient Noise - The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

A-Weighted Sound Pressure Level, dB(A) - The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

Community Noise Equivalent Level (CNEL) - The average, equivalent A-weighted sound level during a 24-hour day obtained by adding five decibels to the hourly noise levels measured during the evening (from 7:00 p.m. to 10:00 p.m.) and by adding ten decibels to the hourly noise levels measured during the night (from 10:00 p.m. to 7:00 a.m.). In this way, CNEL takes into account the lower tolerance of people for noise during evening and nighttime periods.

Decibel (dB) - A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals.

Maximum Noise Level - The maximum instantaneous noise level that occurs during a specific time interval. In acoustics, the maximum sound pressure level is understood to be for single events unless some other kind of level is specified.

Noise - Annoying, harmful, or unwanted sound.

Noise Contour - A line drawn about a noise source indicating constant levels of noise exposure. CNEL is the metric utilized herein to describe community exposure to noise.

Noise Impact Area - A specific area exposed to significant levels of noise.

Noise Reduction - The ability of a material to reduce the noise level from one place to another or between one room and another. Noise reduction is specified in decibels.

Noise-Sensitive Land Uses - Noise-sensitive land uses include, but are not limited to: residences, schools, libraries, hospitals, churches, offices, hotels, motels, and outdoor recreational areas. These typify land uses where suitability is restricted by intrusive noise. Hence, they are termed "noise-sensitive". Noise-sensitivity factors include interference with speech communication, subjective judgement of noise acceptability and relative noisiness, need for freedom from noise intrusion, and sleep interference criteria. The Land Use Element of the General Plan provides a description of the residential areas throughout the city and is considered the source for the inventory of noise-sensitive areas.

Sound - As used herein, sound is a reaction in the ear caused by radiant energy being transmitted from a source by longitudinal pressure waves in air or some other elastic medium.

Sound Level Meter - A measurement instrument containing a microphone, an amplifier, an output meter, and one or more frequency weighting networks. It is used for the determination of sound levels.

APPENDIX III

EFFECTS OF NOISE ON PEOPLE

Effects of Noise on People

Whether a sound is a noise or not will depend on the source of the sound, the loudness relative to the background noise, the time of day, the situation, and the listener. The difference in our reactions is explained by the perceived noisiness, or how undesirable the sound is. An unwanted sound may be extremely irritating though it is not unreasonably loud. Recent studies have documented more serious effects of noise than annoyance; among them are slow, permanent hearing loss and physical and psychological stress.

While permanent deafness is sometimes caused by a single, very loud noise, most noise-induced hearing loss research has been done in the field of industrial noise and "hard rock" music where there is a widespread, periodic exposure to high levels of sound. Two main findings have come out of these studies. First, though the human ear registers a hearing loss after a few hours of exposure to loud noise, its flexibility is such that normal hearing may be completely regained after several hours of rest. Second, constant noise with no rest or frequent exposure to high noise levels over a period of several years will destroy the ability of the ear to recover its normal hearing. What this means is that infrequent exposure to loud noises can actually be less harmful than continuous exposure to a lower, constant noise level. Furthermore, the damage caused by, say, exposure to loud industrial noise during an 8-hour day will be covered by the Federal Workers' Compensation Act, while that caused by exposure to freeway noise over a 24-hour day receives no compensation at all.

Noise is also a contributing factor in medical stress. While the ability to respond quickly to messages can be beneficial to self-

preservation, unnecessary arousal by irrelevant noises can interfere with efficiency, train of thought, and peace of mind. Human responses to frequent noises loud enough to startle or alarm have been linked to such chronic stress symptoms as low resistance, high blood pressure, exhaustion, and ulcers.

Speech interference has been a criterion for a great deal of noise research. Background noise interference naturally contributes to the misunderstanding of spoken communications when one word or more out of a sentence is masked by noise. It can reduce learning in the classroom and job efficiency at the office by forcing voices to be raised. Social psychologists say it may be a large factor in interpersonal friction or arguments. A high degree of speech interference may be accompanied by social disruption and a downgrading of the quality of life.

A consequence of even relatively low noise levels is sleep interference -- people being awakened or kept awake by noise. A high percentage of community complaints against noise generators stem from sleep interference. Steady, droning noise tends to be less disturbing than fluctuating noise levels. Sleep studies have linked interrupted rest to personality change and physiological deterioration.

As a matter of public health as much as community preference, noise pollution must be controlled. The latest findings of physical and emotional effects have mobilized many state and county health departments to strongly recommend a clampdown on noise levels. The areas most vulnerable to the harmful effects of sound seem to be residential communities, particularly at night, but all human activities can be adversely affected by noise.

The effect of noise on real estate values has not been as systematically explored as has been the effect of noise on humans. Federal findings indicate that high noise levels will bring down the economic quality and value of homes, stores, and offices. This conclusion has led to the U.S. Department of Housing and Urban Development's (HUD) directive to withhold funding from projects that do not comply with acceptable noise standards. HUD's concern is divided between adverse effects on humans and economic losses. HUD, therefore, encourages the control of noise sources as well as the control of land use patterns for housing and other municipal needs, thus separating uncontrollable noise sources from residential and other noise-sensitive areas.

APPENDIX IV

Noise Measurement Sites and Analysis of the Data

APPENDIX IV

Table of Contents

METHODOLOGY

Noise measurements were obtained by use of precision sound level meters (noise monitors, per American National Standard ANSA SI.4-1971). The following items of equipment were used during the measurement phase of the study:

1. A-Weighted Noise Level - Analysis

   Community Noise Level Analyzer, B & K Type 4426
   Portable Noise Monitor, BBN Type 614, Serial Number 773504
   Portable Noise Monitor, BBN Type 614, Serial Number 773506

2. Acoustic Calibration

   Acoustic Calibrator, B & K Type 4230 (94 dB @ 1000 Hz.)
   Acoustic Calibrator, GR Type 1567 (114 dB @ 1000 Hz.)

3. Graphic Level Recording

   Graphic Level Recorder, B & K Type 2306

Measurement sites were primarily selected by city staff. At each site, the measurement was obtained at the nearest existing or proposed residential unit to the noise source. Generally, ten minute measurements were obtained. This is a statistically significant period of time for relatively consistent noise sources (such as traffic) and yields results which are approximately equivalent to a one hour measurement.

Table IV-1. Noise Measurements, City of Bakersfield

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas. CNEL[2]
1.	Lake Ming boat drag races overlooking lake & racing activity	10-9-82	9:00 am	27 min	Lake Ming boat races	67.3	79.5	77.2	--	--	--	--	--	--	<60
2.	Lake Ming boat races, no line-of-sight to racing activity	10-9-82	9:00 am	9 min	Lake Ming boat races	47.3	64.5	62.0	--	--	--	--	--	--	<60
3.	Rear yard, 4031 Green Hills	12-6-82	---	24 hrs	Traffic on Rt 178	51.0	58.0	55.3	--	--	--	--	--	--	
						--	--	--	48.0	57.0	54.9	--	--	--	
						--	--	--	--	--	--	50.0	56.0	53.4	55.4[3]
4.	N. side of Mesa Marin Golden Empire Sports Complex, 1/2 mile W. of Rt 184, 40' S. of Rt 178	9-23-83	8:44 am	15 min	Traffic on Rt 178	59.0	76.0	71.2	--	--	--	--	--	--	
		12-6-82	10:32 am	10 min		--	--	--	53.5	69.3	63.6	--	--	--	
		9-23-83	4:23 pm	15 min		--	--	--	--	--	--	64.5	76.5	72.2	65
5.	W. property line, Mesa Marin at center line of speedway, about 120' to raceway (buffered by 15' embankment)	5-7-83	8:24 pm	10 min	Racing activity	--	--	--	--	--	--	69.5	77.0	72.6	<60
6.	Across Rt 184 from Mesa Marin Speedway (direct line-of-sight to raceway and grand stands)	5-7-83	9:13 pm	17 min	Racing activity; crowd noise	--	--	--	--	--	--	83.0	89.0	84.8	66
7.	S.W. corner, Mesa Marin parking lot, about 525' from raceway (buffered by 15'-20' embankment)	5-7-83	7:45 pm	15 min	Racing activity	--	--	--	--	--	--	69.5	73.0	70.3	63
8.	Columbus St., 80' S. of Panorama Dr.	9-23-83	8:06 am	15 min	Traffic on Columbus and Panorama	59.5	69.3	67.4	--	--	--	--	--	--	
		12-2-82	12:32 pm	10 min		--	--	--	57.8	66.3	62.7	--	--	--	
		9-23-83	5:03 pm	15 min		--	--	--	--	--	--	55.3	66.5	62.6	64
9.	Alta Vista Dr., 55' S. of Panorama St.	9-23-83	6:00 am	15 min	Traffic on Alta Vista and Panorama	56.8	67.5	66.7	--	--	--	--	--	--	
		12-3-82	10:35 am	10 min		--	--	--	61.8	68.3	65.0	--	--	--	
		9-23-83	6:33 pm	15 min		--	--	--	--	--	--	62.3	70.8	65.9	66

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas. CNEL[2]
10.	Renegade Ave., 50' E. of Mt. Vernon Ave.	9-23-83	6:23 am	15 min	Traffic on Mt. Vernon	56.5	67.8	63.7	--	--	--	--	--	--	
		12-2-82	12:14 pm	10 min		--	--	--	63.8	69.3	65.4	--	--	--	
		9-23-83	5:24 pm	15 min		--	--	--	--	--	--	65.8	71.8	68.6	67
11.	Rear yard, 2600 Highland	12-6-82	---	24 hr	Traffic on Rt 178	52.0	60.0	56.6	--	--	--	--	--	--	
						--	--	--	51.0	59.0	56.6	--	--	--	
						--	--	--	--	--	--	52.0	60.0	56.6	56.8[3]
12.	Highland Oaks, 40' E. of Fairfax	9-23-83	8:25 am	15 min	Traffic on Fairfax	58.5	66.0	62.9	--	--	--	--	--	--	
		12-2-82	12:46 pm	10 min	and Highland Oaks	--	--	--	46.3	61.5	56.6	--	--	--	
		9-23-83	4:43 pm	15 min		--	--	--	--	--	--	55.5	56.8	56.2	<60
13.	Antonino Way, 50' E. of Pierce Rd., about 200' E. of Rt 99	10-11-83	7:47 am	15 min	Traffic on Pierce,	68.8	74.0	70.8	--	--	--	--	--	--	
		9-16-83	10:00a m	15 min	Antonino, and Rt 99	--	--	--	66.8	72.5	68.9	--	--	--	
		10-11-83	6:20 pm	15 min		--	--	--	--	--	--	67.3	73.3	70.6	71
14.	E. end of vacant land off Brittan, about 150' W. of Rt 204	10-11-83	8:05 am	15 min	Traffic on Rt 204	54.0	58.8	58.6	--	--	--	--	--	--	
		12-6-82	12:10 pm	10 min		--	--	--	54.5	57.8	55.6	--	--	--	
		10-11-83	6:50 pm	15 min		--	--	--	--	--	--	54.0	55.5	54.8	60
15.	N.W. Corner "Q" St. & W. Columbus St. (entrance to Royal Palms Mobile Estates), 30' N. of Columbus	9-22-83	8:17 am	15 min	Traffic on Columbus	63.8	71.5	68.5	--	--	--	--	--	--	
		12-3-82	10:06 am	10 min		--	--	--	61.5	69.0	65.0	--	--	--	
		9-22-83	6:59 pm	15 min		--	--	--	--	--	--	63.8	71.0	67.3	68
16.	Alturas Dr., 30' N. of Columbus	9-22-83	8:37 am	15 min	Traffic on Columbus	61.3	67.8	64.4	--	--	--	--	--	--	
		12-3-82	10:20 am	10 min	and Alturas	--	--	--	54.3	64.5	59.9	--	--	--	
		9-23-83	6:52 pm	15 min		--	--	--	--	--	--	62.3	68.0	64.5	65
17.	Del Amo Way, 50' W of Mt. Vernon	9-23-83	6:43 am	15 min	Traffic on Mt. Vernon	62.3	69.5	65.1	--	--	--	--	--	--	
		12-2-82	12:00 pm	10 min	and Del Almo	--	--	--	65.5	70.0	66.8	--	--	--	
		9-23-83	5:44 pm	15 min		--	--	--	--	--	--	70.0	74.8	71.3	68
18.	Adjacent to property line fence at N. end of vacant land W. of Oswell St., about 500' S. of Rt 178	9-23-83	7:04 am	15 min	Traffic on Rt 178	61.0	63.5	61.1	--	--	--	--	--	--	
		12-6-82	10:51 am	10 min		--	--	--	55.0	59.3	55.7	--	--	--	
		9-23-83	4:00 pm	15 min		--	--	--	--	--	--	58.5	61.8	59.0	62
19.	Parking lot, Memorial Hospital, 30' to 34th St.	9-22-83	8:01 am	15 min	Traffic on San Dimas,	61.0	67.5	63.5	--	--	--	--	--	--	
		12-3-82	11:59 am	10 min	34th St., parking lot	--	--	--	65.3	69.3	66.6	--	--	--	
		9-22-83	6:42 pm	15 min	activity	--	--	--	--	--	--	60.0	65.3	61.9	65

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas. CNEL[2]
20.	Grace St., 55' E. of Beale Ave.	9-22-83	7:04 am	15 min	Traffic on Beale and Grace; children at Jefferson School	62.8	69.0	65.6	--	--	--	--	--	--	
		12-3-82	10:50 am	10 min		--	--	--	63.0	68.3	64.7	--	--	--	
		9-22-83	5:49 pm	15 min		--	--	--	--	--	--	64.0	69.3	65.6	67
21.	Weill Park, 50' to "Q" St., about 100' to freeway interchange	9-22-83	7:43 am	15 min	Traffic on "Q" St., freeways	61.8	69.5	65.5	--	--	--	--	--	--	
		12-3-82	12:16 pm	10 min		--	--	--	57.8	62.0	59.1	--	--	--	
		9-22-83	6:25 pm	15 min		--	--	--	--	--	--	61.0	67.5	64.8	64[4]
22.	Stockton, 30' N. of Niles, about 100' N. of Rt 178	9-22-83	7:24 am	15 min	Traffic on Niles and Rt 178	67.8	71.0	68.4	--	--	--	--	--	--	
		9-14-83	10:41 am	15 min		--	--	--	61.3	66.0	63.4	--	--	--	
		9-22-83	6:07 pm	15 min		--	--	--	--	--	--	59.5	65.5	61.9	67
23.	Oregon Dr., 40' W. of Beale Ave.	9-22-83	6:41 am	15 min	Traffic on Oregon and Beale	47.8	52.5	51.2	--	--	--	--	--	--	
		12-2-82	1:27 pm	10 min		--	--	--	62.0	68.0	64.1	--	--	--	
		9-22-83	5:31 pm	15 min		--	--	--	--	--	--	65.8	71.5	68.2	68
24.	Orange Dr., 20' S. of Flower St.	9-22-83	6:00 am	15 min	Traffic on Flower	61.0	68.3	64.1	--	--	--	--	--	--	
		12-3-82	11:32 am	10 min		--	--	--	60.0	69.0	65.0	--	--	--	
		9-22-83	4:54 pm	15 min		--	--	--	--	--	--	58.3	64.3	62.3	65
25.	Paola Ave., 50' W. of Lynwood St., about 100' to 150' N. of Niles	9-23-83	7:32 am	15 min	Traffic on Lynwood and Niles	52.8	62.5	58.6	--	--	--	--	--	--	
		12-2-82	11:33 am	10 min		--	--	--	53.3	60.0	56.2	--	--	--	
		9-23-83	6:05 pm	15 min		--	--	--	--	--	--	52.8	61.8	59.5	<60
26.	Pine St., 40' N. of 24th St.	9-9-83	7:31 am	15 min	Traffic on 24th St.	68.3	72.3	69.2	--	--	--	--	--	--	
		12-2-82	2:16 pm	10 min		--	--	--	70.5	73.8	70.8	--	--	--	
		9-8-83	6:08 pm	15 min		--	--	--	--	--	--	64.5	68.8	65.5	70
27.	"F" St., halfway between 23rd & 24th	9-9-83	7:13 am	15 min	Traffic on 23rd, 24th, and "F" St.	66.0	70.5	67.2	--	--	--	--	--	--	
		12-2-82	2:29 pm	10 min		--	--	--	62.3	66.8	63.3	--	--	--	
		9-8-83	5:50 pm	15 min		--	--	--	--	--	--	65.3	72.3	69.0	70
28.	"K" St., halfway between 23rd & 24th	9-9-83	6:57 am	15 min	Traffic on 23rd, 24th, "K" St., & industrial activity	59.5	67.0	62.9	--	--	--	--	--	--	
		12-2-82	2:42 pm	10 min		--	--	--	61.5	65.0	62.7	--	--	--	
		9-8-83	5:30 pm	15 min		--	--	--	--	--	--	65.3	66.3	66.0	67
29.	21st St., 50' E. of Chester Ave.	9-9-83	8:43 am	15 min	Traffic on 21st & Chester	65.8	72.3	68.7	--	--	--	--	--	--	
		12-2-82	2:58 pm	10 min		--	--	--	66.0	72.0	68.3	--	--	--	
		9-8-83	4:40 pm	15 min		--	--	--	--	--	--	66.8	72.3	68.5	68

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas, CNEL[2]
30.	"O" St., 50' N. of 22nd St.	9-9-83	6:38 am	15 min	Traffic on Rt 178, 21st,	50.8	54.5	53.6	--	--	--	--	--	--	
		9-9-83	10:40 am	15 min	& 22nd St.	--	--	--	55.2	61.8	58.5	--	--	--	
		9-8-83	5:10 pm	15 min		--	--	--	--	--	--	56.8	60.0	57.8	<60
31.	Parking lot, Central Park, 40' to "R" St.	9-9-83	6:20 am	15 min	Traffic on "R", "Q", &	51.5	55.8	53.6	--	--	--	--	--	--	
		9-9-83	11:00 am	15 min	20th St., industrial	--	--	--	55.0	58.5	56.1	--	--	--	
		9-8-83	4:20 pm	15 min	activity	--	--	--	--	--	--	55.3	58.5	56.2	<60
32.	Haley St., 30' N. of Kentucky St.	9-22-83	6:18 am	15 min	Traffic on Kentucky &	60.3	65.8	61.4	--	--	--	--	--	--	
		12-3-82	11:07 am	10 min	Haley; RR yard activity	--	--	--	63.5	70.0	66.0	--	--	--	
		9-22-83	5:13 pm	15 min		--	--	--	--	--	--	64.5	71.0	62.5	66
33.	Vacant land on S. side of Truxtun Ave., 100' E. of Rt. 99	10-11-83	6:20 am	15 min	Traffic on Truxtun,	58.5	60.3	58.8	--	--	--	--	--	--	
		9-9-83	10:00 am	15 min	Rt. 99	--	--	--	64.3	66.0	63.6	--	--	--	
		10-11-83	5:00 pm	15 min		--	--	--	--	--	--	64.3	66.8	64.4	64[4]
34.	Pine St., 50' N. of Truxtun Ave.	9-9-83	7:50 am	15 min	Traffic on Rt 178	64.8	69.8	66.7	--	--	--	--	--	--	
		12-6-82	11:16 am	10 min		--	--	--	61.0	65.8	62.2	--	--	--	
		9-8-83	6:16 pm	15 min		--	--	--	--	--	--	54.0	62.5	58.9	67
35.	"A" St., 40' N. of 16th St.	9-9-83	8:05 am	15 min	Traffic on "A" & 16th;	65.0	70.5	67.0	--	--	--	--	--	--	
		12-6-82	11:30 am	10 min	RR yard activity	--	--	--	52.8	58.5	54.9	--	--	--	
		9-8-83	6:52 pm	15 min		--	--	--	--	--	--	59.0	64.3	61.5	66[5]
36.	"B" St., 40' S. of 18th St.	9-9-83	8:23 am	15 min	Traffic on "B" & 18th	52.0	58.5	55.1	--	--	--	--	--	--	
		12-6-82	11:48 am	10 min		--	--	--	57.0	63.5	59.5	--	--	--	
		9-8-83	6:34 pm	15 min		--	--	--	--	--	--	50.3	55.5	52.4	<60
37.	Parking lot, Civic Auditorium 45' to Truxtun Ave.	9-9-83	6:00 am	15 min	Traffic on Truxtun	47.0	55.3	50.0	--	--	--	--	--	--	
		9-9-83	10:20 am	15 min		--	--	--	59.5	67.0	63.0	--	--	--	
		9-8-83	4:00 pm	15 min		--	--	--	--	--	--	55.0	67.0	63.9	64[5]
38.	Eureka, 50' W. of Robinson	9-16-83	8:22 am	15 min	Traffic on Robinson;	50.3	55.5	52.9	--	--	--	--	--	--	
		12-2-82	10:40 am	10 min	some aircraft	--	--	--	48.0	57.5	53.9	--	--	--	
		9-22-83	4:00 pm	15 min		--	--	--	--	--	--	48.8	54.0	51.4	<60
39.	Exchange, 50' N. of California Ave.	9-16-83	8:40 am	15 min	Traffic on California	56.8	65.5	61.1	--	--	--	--	--	--	
		12-2-82	10:54 am	10 min		--	--	--	57.8	66.0	62.9	--	--	--	
		9-22-83	4:17 pm	15 min		--	--	--	--	--	--	61.5	68.8	66.0	65

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas. CNEL[2]
40.	Pioneer Dr., 50' E. of Coffee	9-16-83	8:58 am	15 min	Traffic on Pioneer &	64.5	71.8	68.4	--	--	--	--	--	--	
		12-2-82	11:08 am	10 min	Oswell	--	--	--	64.0	70.5	67.9	--	--	--	
		9-22-83	4:34 pm	15 min		--	--	--	--	--	--	67.3	73.0	70.2	69
41.	Westfield, 50' E. of Coffee	10-11-83	7:20 am	15 min	Traffic on Westfield &	71.3	76.5	72.9	--	--	--	--	--	--	
		12-3-82	2:57 pm	10 min	Coffee	--	--	--	65.3	70.8	68.0	--	--	--	
		9-13-83	6:02 pm	15 min		--	--	--	--	--	--	64.0	69.5	66.3	69
42.	Vacant land, 40' N. of Truxtun Ave., W. of Mohawk	10-11-83	6:50 am	15 min	Traffic on Truxtun	62.0	66.0	63.4	--	--	--	--	--	--	
		12-3-82	2:42 pm	10 min		--	--	--	63.3	69.0	65.6	--	--	--	
		10-11-83	5:25 pm	15 min		--	--	--	--	--	--	65.8	69.5	66.8	65
43.	Parking lot of apts. on S. side of California Ave. between Chester Ln. & Easton Dr., 30' S. of California Ave.	9-14-83	7:09 am	15 min	Traffic on California	63.8	71.3	67.0	--	--	--	--	--	--	
		12-3-82	2:27 pm	10 min		--	--	--	65.8	71.0	67.5	--	--	--	
		9-13-83	4:57 pm	15 min		--	--	--	--	--	--	66.0	70.3	66.7	67
44.	Myrtle St., 30' S. of California Ave.	9-7-83	6:40 am	15 min	Traffic on California &	64.5	72.5	68.9	--	--	--	--	--	--	
		12-3-82	1:17 pm	10 min	Myrtle; RR activity	--	--	--	68.5	73.5	69.8	--	--	--	
		9-6-83	4:41 pm	15 min		--	--	--	--	--	--	68.5	73.5	70.5	70
45.	"A" St., 30' S. of California Ave.	9-7-83	6:57 am	15 min	Traffic on "A" St. &	65.5	72.0	70.1	--	--	--	--	--	--	
		12-3-82	1:01 pm	10 min	California; RR activity	--	--	--	68.0	72.8	69.7	--	--	--	
		9-6-83	4:59 pm	15 min		--	--	--	--	--	--	69.0	74.0	71.3	70
46.	10th St., 40' E. of Union	9-7-83	8:30 am	15 min	Traffic on Union & 10th;	69.0	74.5	71.3	--	--	--	--	--	--	
		12-2-82	10:26 am	10 min	industrial activity	--	--	--	69.8	74.0	70.7	--	--	--	
		9-6-83	6:32 pm	15 min		--	--	--	--	--	--	66.0	71.0	68.6	71
47.	Marella, 40' N. of Montclair St.	9-14-83	7:27 am	15 min	Traffic on Marella &	62.8	70.5	66.6	--	--	--	--	--	--	
		9-13-83	11:27 am	15 min	Montclair; park activity	--	--	--	53.5	62.5	58.0	--	--	--	
		9-13-83	5:16 pm	15 min		--	--	--	--	--	--	60.0	69.3	65.3	<60
48.	Garnsey Ln., 40' W. of Real Rd.	9-14-83	6:51 am	15 min	Traffic on Garnsey & Real	62.0	68.5	65.1	--	--	--	--	--	--	
		12-3-82	2:09 pm	10 min		--	--	--	63.8	68.5	65.3	--	--	--	
		9-13-83	4:38 pm	15 min		--	--	--	--	--	--	64.0	70.0	68.3	68
49.	"A" St., 40' N. of Palm St.	9-7-83	7:15 am	15 min	Traffic on "A" & Palm	59.0	67.0	63.5	--	--	--	--	--	--	
		12-3-82	12:48 pm	10 min		--	--	--	61.0	67.8	64.4	--	--	--	
		9-6-83	5:17 pm	15 min		--	--	--	--	--	--	62.0	67.0	64.8	65

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas. CNEL[2]
50.	Dracena St., 50' W. of "H" St.	9-7-83	7:34 am	15 min	Traffic on "H" & Dracena	64.5	69.0	66.2	--	--	--	--	--	--	
		12-3-82	12:35 pm	10 min		--	--	--	64.5	69.8	66.1	--	--	--	
		9-6-83	5:36 pm	15 min		--	--	--	--	--	--	64.5	71.0	67.9	67
51.	Ivy Court, 40' W. of Real Rd.	9-14-83	6:34 am	15 min	Traffic on Real	58.8	67.5	63.7	--	--	--	--	--	--	
		12-3-82	1:57 pm	10 min		--	--	--	60.5	65.8	62.4	--	--	--	
		9-13-83	4:19 pm	15 min		--	--	--	--	--	--	61.0	67.0	63.2	64
52.	Parking lot of restaurant near Oak St. & Rt 99, about 400' to fwy	9-7-83	6:20 am	15 min	Traffic on Rt 99, Oak St.	65.0	70.0	67.0	--	--	--	--	--	--	
		9-8-83	12:45 pm	15 min		--	--	--	69.8	74.0	70.8	--	--	--	
		9-6-83	4:22 pm	15 min		--	--	--	--	--	--	65.0	69.0	67.1	68
53.	Chester Place, 50' E. of Chester Ave.	9-7-83	7:52 am	15 min	Traffic on Chester Ave. & Chester Place	69.0	73.0	71.0	--	--	--	--	--	--	
		9-8-83	12:20 pm	15 min		--	--	--	60.3	63.8	60.9	--	--	--	
		9-6-83	5:54 pm	15 min		--	--	--	--	--	--	64.5	70.0	67.0	68
54.	"T" St., 30' N. of 4th St.	9-7-83	8:11 am	15 min	Traffic on 4th St. & "T" St.; children at school	58.0	66.0	63.3	--	--	--	--	--	--	
		12-3-82	1:36 pm	10 min		--	--	--	63.3	69.0	65.9	--	--	--	
		9-6-83	6:13 pm	15 min		--	--	--	--	--	--	57.0	64.5	62.2	63
55.	Northrup St., 65' N. of Brundage Ln.	9-16-83	8:00 am	15 min	Traffic on Brundage & Rt 56	62.3	70.8	62.8	--	--	--	--	--	--	
		9-14-83	10:12 am	15 min		--	--	--	59.5	68.5	64.0	--	--	--	
		10-11-83	4:00 pm	15 min		--	--	--	--	--	--	61.0	68.8	64.9	66
56.	Reina Way, 36' E. of Gosford Rd.	10-19-82	6:40 am	35 min	Traffic on Gosford	58.3	72.5	67.6	--	--	--	--	--	--	
		9-13-83	12:14 pm	15 min		--	--	--	59.3	68.3	64.5	--	--	--	
		9-13-83	6:21 pm	15 min		--	--	--	--	--	--	62.8	70.0	66.2	66
57.	Griffiths St., 50' S. of Stockdale Hwy.	9-14-83	6:17 am	15 min	Traffic on Brundage	62.3	68.8	64.9	--	--	--	--	--	--	
		12-1-82	10:30 am	10 min		--	--	--	65.8	70.8	67.5	--	--	--	
		9-13-83	5:35 pm	15 min		--	--	--	--	--	--	64.8	68.8	65.6	66
58.	Elcia Dr., 40' E. of S. Real	9-14-83	6:00 am	15 min	Traffic on Real & Elcia	54.5	66.3	64.4	--	--	--	--	--	--	
		9-13-83	11:01 am	15 min		--	--	--	62.0	68.3	65.2	--	--	--	
		9-13-83	4:00 pm	15 min		--	--	--	--	--	--	61.5	67.0	63.6	64
59.	E. end of Houchin	9-7-83	6:36 am	15 min	Traffic on Rt 58	70.5	75.8	72.2	--	--	--	--	--	--	
		12-1-82	12:29 pm	10 min		--	--	--	65.8	71.3	67.5	--	--	--	
		9-6-83	4:37 pm	15 min		--	--	--	--	--	--	71.5	75.0	72.1	71

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas. CNEL[2]
60.	"N" St., 40' S. of Brundage Ln.	9-7-83	6:00 am	15 min	Traffic on Brundage & Rt 58	56.0	63.0	59.7	--	--	--	--	--	--	
		9-8-83	12:00 pm	15 min		--	--	--	62.5	67.5	64.4	--	--	--	
		9-6-83	4:00 pm	15 min		--	--	--	--	--	--	62.5	68.5	66.4	66
61.	Nordic Dr., 55' E. of New Stine	9-14-83	8:05 am	15 min	Traffic on New Stine	67.0	71.0	68.2	--	--	--	--	--	--	
		9-13-83	11:52 am	15 min		--	--	--	65.0	70.0	67.5	--	--	--	
		9-12-83	4:00 pm	15 min		--	--	--	--	--	--	64.0	69.5	65.9	67
62.	Wood Ln., 50' E. of Wible	9-7-83	6:55 am	15 min	Traffic on Wible, Wood, and Rt 99	66.5	71.3	67.9	--	--	--	--	--	--	
		9-8-83	1:26 pm	15 min		--	--	--	69.0	72.8	70.0	--	--	--	
		9-6-83	4:57 pm	15 min		--	--	--	--	--	--	69.0	72.5	69.8	69
63.	Calle Hija, 50' N. of Ming Rd.	10-19-82	6:10 am	25 min	Traffic on Ming	48.5	66.5	62.9	--	--	--	--	--	--	
		9-13-83	12:33 pm	15 min		--	--	--	55.3	64.5	62.3	--	--	--	
		9-13-83	6:40 pm	15 min		--	--	--	--	--	--	58.3	64.0	60.4	62
64.	E. end of Columbus Ct.	9-16-83	6:00 am	15 min	Traffic on Ashe	42.0	44.8	42.4	--	--	--	--	--	--	
		12-1-82	11:10 am	10 min		--	--	--	46.5	50.8	48.8	--	--	--	
		9-12-83	4:18 pm	15 min		--	--	--	--	--	--	47.5	52.0	50.0	<60
65.	Canter Way, 45' N. of Ming Ave.	9-14-83	7:48 am	15 min	Traffic on Ming & Canter	66.0	71.8	68.0	--	--	--	--	--	--	
		12-1-82	11:48 am	10 min		--	--	--	66.5	71.3	68.2	--	--	--	
		9-12-83	4:36 pm	15 min		--	--	--	--	--	--	65.5	70.3	67.0	68
66.	Hughes Ln., 60' S. of Ming Ave.	9-7-83	7:14 am	15 min	Traffic on Ming & Hughes	65.0	70.8	67.3	--	--	--	--	--	--	
		12-1-82	2:50 pm	10 min		--	--	--	64.5	69.5	66.1	--	--	--	
		9-6-83	5:16 pm	15 min		--	--	--	--	--	--	65.8	72.0	69.0	68
67.	La France Dr., 75' W. of S. Chester Ave.	9-7-83	6:18 am	15 min	Traffic on Chester & La France	52.0	61.8	57.6	--	--	--	--	--	--	
		12-1-82	12:45 pm	10 min		--	--	--	60.3	65.5	61.8	--	--	--	
		9-6-83	4:18 pm	15 min		--	--	--	--	--	--	59.5	65.0	61.9	62
68.	El Toro Dr., 30' N. of Ming Ave.	9-7-83	6:00 am	15 min	Traffic on Ming & El Toro	51.8	63.8	61.6	--	--	--	--	--	--	
		9-8-83	1:48 pm	15 min		--	--	--	59.5	66.0	62.8	--	--	--	
		9-6-83	4:00 pm	15 min		--	--	--	--	--	--	62.3	67.8	65.1	64
69.	Rear yard, 213 Ethrum Ave.	12-2-82	--	24 hr	Traffic; aircraft activity	59.0	64.0	61.5	--	--	--	--	--	--	
						--	--	--	55.0	62.0	60.3	--	--	--	
						--	--	--	--	--	--	47.0	55.0	56.8	60.2[3]

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas. CNEL[2]
70.	Sandpiper Dr., 45' N. of Wilson	9-14-83	8:25 am	15 min	Traffic on Wilson	64.8	72.3	68.9	--	--	--	--	--	--	
		9-13-83	12:56 pm	15 min		--	--	--	67.0	72.5	68.8	--	--	--	
		9-12-83	4:55 pm	15 min		--	--	--	--	--	--	59.0	64.3	60.0	67
71.	Hendricks Ln., 50' W. of S. "H" St.	9-7-83	7:33 am	15 min	Traffic on "H" & Hendricks	64.0	71.0	68.4	--	--	--	--	--	--	
		12-1-82	1:01 pm	10 min		--	--	--	62.5	68.3	64.6	--	--	--	
		9-6-83	5:35 pm	15 min		--	--	--	--	--	--	67.0	73.3	70.8	67
72.	65' E. of Stine Rd. (residential setback), about 500' N. of Planz	9-14-83	8:43 am	15 min	Traffic on Stine Rd., Planz	62.3	69.3	65.1	--	--	--	--	--	--	
		9-13-83	1:14 pm	15 min		--	--	--	58.5	65.5	61.5	--	--	--	
		9-12-83	5:13 pm	15 min		--	--	--	--	--	--	65.0	69.3	66.0	65
73.	Parking lot of apts. on SW corner of Planz & Wible, 130' W. of Wible, 160' S. of Planz	9-7-83	8:49 am	15 min	Traffic on Planz, Wible, & Rt 99	53.5	56.5	54.5	--	--	--	--	--	--	
		12-1-82	1:20 pm	10 min		--	--	--	56.0	60.0	59.3	--	--	--	
		9-6-83	6:31 pm	15 min		--	--	--	--	--	--	56.0	58.8	56.9	<60
74.	Wilson R., 50' N. of White Ln.	9-16-83	6:20 am	15 min	Traffic on Wilson & White	63.8	72.5	68.6	--	--	--	--	--	--	
		12-1-82	11:30 am	10 min		--	--	--	61.3	70.3	66.2	--	--	--	
		9-12-83	5:32 pm	15 min		--	--	--	--	--	--	67.3	72.8	69.7	68
75.	S. Real, 50' S. of White Ln.	9-7-83	8:29 am	15 min	Traffic on Real & White	54.0	58.3	55.1	--	--	--	--	--	--	
		12-1-82	1:37 pm	10 min		--	--	--	63.0	70.0	66.1	--	--	--	
		9-6-83	6:49 pm	15 min		--	--	--	--	--	--	51.3	55.8	53.1	67
76.	Onramp from White Ln. to northbound Rt 99, nearest Holiday Inn Motel unit to fwy; about 125' to onramp	9-7-83	8:10 am	15 min	Traffic on Rt 99	59.5	63.8	60.7	--	--	--	--	--	--	
		9-8-83	2:50 pm	15 min		--	--	--	64.3	68.0	64.8	--	--	--	
		9-6-83	6:12 pm	15 min		--	--	--	--	--	--	59.0	63.5	60.6	66
77.	On "H" St., about 200' N. of White Ln.	9-7-83	7:52 am	15 min	Traffic on "H" St., White Lane	59.5	64.3	61.0	--	--	--	--	--	--	
		9-8-83	2:20 pm	15 min		--	--	--	61.5	66.0	62.3	--	--	--	
		9-6-83	5:53 pm	15 min		--	--	--	--	--	--	57.0	61.3	58.7	63
78.	Front yard, 1204 White Ln.	12-2-82	--	24 hr.	Traffic on White Ln.	57.0	64.0	61.6	--	--	--	--	--	--	
						--	--	--	59.0	64.0	64.3	--	--	--	
						--	--	--	--	--	--	60.0	65.0	62.8	65.0[3]
79.	Pacheco Rd., 80' E. of Stine Rd.	9-16-83	6:40 am	15 min	Traffic on Pacheco Rd., Stine Rd.	61.8	69.8	66.1	--	--	--	--	--	--	
		9-13-83	2:00 pm	15 min		--	--	--	59.5	67.0	63.3	--	--	--	
		9-12-83	5:51 pm	15 min		--	--	--	--	--	--	62.0	67.8	63.8	64

Pos. No.	Location	Date	Time	Duration	Noise Source	A-Weighted Sound Level, dB(A)[1] Morning L50	Morning L10	Morning Leq	Midday L50	Midday L10	Midday Leq	Evening L50	Evening L10	Evening Leq	Est. or Meas, CNEL[2]
80.	Summerfield Dr., 75' N. of Panama Ln.	9-16-83	6:57 am	15 min	Traffic on Panama,	58.0	72.3	67.8	--	--	--	--	--	--	
		9-13-83	2:21 pm	15 min	Summerfield	--	--	--	48.5	61.3	57.1	--	--	--	
		9-12-83	6:10 pm	15 min		--	--	--	--	--	--	49.3	65.3	62.3	64
81.	Denner Dr., about 250' W. of Rt 99	9-16-83	7:15 am	15 min	Traffic on Rt 99, Denner	59.8	65.0	62.4	--	--	--	--	--	--	
		9-13-83	2:44 pm	15 min	Dr.	--	--	--	56.5	63.8	60.2	--	--	--	
		9-12-83	6:30 pm	15 min		--	--	--	--	--	--	60.3	64.3	61.2	64[4]
82.	Fairview Rd., 70' W. of S. "H" St.	9-16-83	7:35 am	15 min	Traffic on Fairview &	64.5	71.3	66.1	--	--	--	--	--	--	
		9-16-83	10:36 am	15 min	"H"	--	--	--	61.8	69.3	66.0	--	--	--	
		9-12-83	6:50 pm	15 min		--	--	--	--	--	--	61.3	68.8	66.9	66

1. L50 and L10 are the sound levels exceeded during 50% and 10% of the measurement period, respectively. Leq is the equivalent sound level. "Morning" refers to the hours of 6:00 a.m. to 9:00 a.m., "Midday" refers to the hours from 10:00 a.m. to 3:00 p.m., and "Evening" refers to the hours from 4:00 p.m. to 7:00 p.m.

2. Value in "CNEL" column is estimated from measured Leq values. This value takes into account the barrier effects of adjacent buildings and walls, as well as the topography. Therefore, the measured value differs from that indicated on the CNEL contour maps.

3. Value in "CNEL" column actually measured during a 24-hour measurement at the site. This value takes into account the barrier effects of adjacent buildings and walls, as well as the topography. Therefore, the measured value differs from that indicated on the CNEL contour maps.

4. CNEL value is lower than that indicated on CNEL contour maps due to "shadow" effect created by elevated arterial or by barrier effects of ramps or interchanges.

5. Estimated CNEL value is for traffic only and is less than that indicated on contour maps since maps reflect combination of railroad and traffic noise.

Table IV-2. Summary of Measured or Estimated Noise Levels at School Locations, City of Bakersfield
April 1983

School: BAKERSFIELD CITY SCHOOL DISTRICT	Equivalent Sound Level, Leq
Casa Loma School	<65 dB(A)*
Chipman Jr. High School	<65*
College Heights School	65
Compton Jr. High School	62
Curran Jr. High School	<65*
Henry Eissler School	<65*
Emerson Jr. High School	66*
Franklin School	62*
John C. Fremont School	<65*
Ruth Harding School	<65*
Caroline Harris School	<65*
Hort School	<65*
Rafer Johnson School	<65*
Longfellow School	65
Horace Mann School	64
McKinley School	66*
Mount Vernon School	62
Millie Gardette Munsey School	<65*
Colonel Howard Nichols School	<65*
Myra A. Noble School	52
Bessie Owens	<65*
Leo G. Pauly School	<65*
William Penn School	<65*
Pioneer Drive School	<65*
Roosevelt School	<65*
Sierra Jr. High School	66*
Marsa Voorhies School	<65*
Washington Jr. High School	52
Wayside School	65*
Frank West School	<65*
Williams School	<65*

School:	Equivalent Sound Level, Leq
FAIRFAX SCHOOL DISTRICT	
Virginia Avenue School	<65 dB(A)*
FRUITVALE SCHOOL DISTRICT	
Quailwood Elementary School	<65*
GREENFIELD UNION SCHOOL DISTRICT	
Fairview School	<65*
Greenfield Jr. High School	<65*
Plantation School	70*
Planz School	<65*
PANAMA UNION SCHOOL DISTRICT	
O. J. Actis Jr. High School	<65*
Charles H. Castle School	<65*
Laurel Glen School (proposed)	63*
Louise Sandrini School	<65*
Amy B. Seibert School	<65*
Stine School	68*
Stockdale School	<65*
Fred L. Thompson Jr. High School	<65*
Wayne Van Horn School	<65*
KERN UNION HIGH SCHOOL DISTRICT	
Bakersfield Adult School (at BHS)	70*
Bakersfield High School	70*
East Bakersfield High School	61
Foothill High School	<65*
Highland High School	<65*
Regional Occupational Center	<65*
Ruggenberg Career Center	<65*
South High School	<65*
Vista High School	<65*
Vista-East Continuation High School	<65*
West High School	67*

School:	Equivalent Sound Level, Leq
KERN COUNTY COMMUNITY COLLEGE DISTRICT	
Bakersfield College	<65 dB(A)*
Bakersfield College, Downtown Center	<68*
COLLEGES	
California State College, Bakersfield	<65*
PRIVATE, CHURCH, AND SPECIAL SCHOOLS	
Carden School of Bakersfield	58
Garces Memorial High School	60*
Orangewood Elementary School	<65*
Saint Francis School	64*

*Estimated

APPENDIX V

Traffic Analysis and Community Noise Equivalent Level (CNEL) Data for Major and Secondary Arterials, April 1, 1983

APPENDIX V

Table of Contents

Methodology for Estimating Location of CNEL Contour Lines

Noise produced by traffic on major and secondary arterials may be estimated by use of recognized procedures described in reports available from the Highway Research Board (1, 2, 3). These procedures consider the following parameters:

1. Average volume of traffic.
2. Speed of traffic.
3. Number of traffic lanes.
4. Distance from traffic lane to receiver.
5. Mix of traffic (autos and trucks).
6. Elevation of the arterial relative to the receiver.
7. Gradient of the arterial (up or down hill).

Reasonably conservative estimates of the community noise equivalent level (CNEL) for arterial highway traffic situation are provided in Figure V-1. These estimates are for receiver locations at the same grade as the arterial with little or no gradient. It should also be noted that these estimates are for a 4% truck mix. An analysis using the Federal Highway Administration's Highway Noise Reduction Model (4) indicates that various truck mixes as follows:

Truck Mix	Change in CNEL
3.5%	+0 dB
5%	+0.5
7%	+1.5
16%	+4.0
25%	+6.0

Figure V-2 indicates the approximate corrections for arterials that are elevated or depressed relative to the receiver as well as the variation in CNEL with distance.

References

1. "Highway Noise, Measurement, Simulation, and Mixed Reactions", Highway Research Board, Report 78 (1969).

2. "Highway Noise, A Design Guide for Highway Engineers", Highway Research Board, Report 117 (1971).

3. "Highway Noise, A Field Evaluation of Traffic Noise Reduction Measurements", Highway Research Board, Report 144 (1973).

4. "FHWA Highway Traffic Noise Prediction Model", FHWA-RD-77-108, December 1978.

Table V-1. Distances to Existing and Projected CNEL Contour Lines, Bakersfield

	Existing 1982	Projected 2000	CNEL at 50 Feet			Distance to Contour Lines, 1982					Distance to Contour Lines, 2000				
			1982	2000	Change	60dB	65dB	70dB	75dB	80dB	60dB	65dB	70dB	75dB	80dB
ALFRED HARRELL HIGHWAY															
China Grade Loop to Hart Park	3,900	7,400	63.5 dB	66.5 dB	+3.0 dB	100'	---	---	---	---	170'	69'	---	---	---
North of Rt. 178	3,900	4,000	63.5	63.5	0.0	100'	---	---	---	---	100'	---	---	---	---
ASHE ROAD															
Panama to Stockdale (proposed)	5,800	16,000	64.5	68.0	+3.5	120'	---	---	---	---	215'	90'	---	---	---
BEALE AVENUE															
Truxtun to River	15,100	17,800	69.5	70.0	+0.5	278'	120'	---	---	---	300'	130'	50'	---	---
BELLE TERRACE															
New Stine to Wible	7,900	24,100	65.5	70.0	+4.5	143'	56'	---	---	---	300'	130'	50'	---	---
Wible to Union	5,800	25,200	64.5	70.0	+5.5	120'	---	---	---	---	300'	130'	50'	---	---
BERNARD STREET															
Union to River	11,100	15,000	66.5	68.0	+1.5	170'	69'	---	---	---	215'	90'	---	---	---
River to Mt. Vernon	6,000	9,600	64.5	66.0	+1.5	120'	---	---	---	---	155'	62'	---	---	---
BRUNDAGE LANE															
Oak to Chester	21,600	27,000	71.0	71.5	+0.5	340'	155'	62'	---	---	368'	170'	69'	---	---
Chester to Union	21,600	25,100	71.0	71.5	+0.5	340'	155'	62'	---	---	368'	170'	69'	---	---
Union to Cottonwood	11,900	22,600	68.5	71.0	+2.5	235'	100'	---	---	---	340'	155'	62'	---	---
Cottonwood to Mt. Vernon	11,900	18,100	68.5	70.0	+1.5	235'	100'	---	---	---	300'	130'	50'	---	---
CALIFORNIA AVENUE															
Stockdale to Rt. 99	29,000	45,600	72.0	74.0	+2.0	395'	185'	75'	---	---	520'	255'	110'	---	---
East of Rt. 99	28,600	42,900	72.0	74.0	+2.0	395'	185'	75'	---	---	520'	255'	110'	---	---
West of Chester	31,100	39,200	72.0	73.5	+1.5	395'	185'	75'	---	---	490'	235'	100'	---	---
Chester to Union	22,800	48,100	71.0	74.0	+3.0	340'	155'	62'	---	---	520'	255'	110'	---	---
Union to Mt. Vernon	10,600	22,000	68.0	71.0	+3.0	215'	90'	---	---	---	340'	155'	62'	---	---
CASA LOMA DRIVE															
Union to Cottonwood	9,800	27,900	66.5	70.5	+4.0	170'	69'	---	---	---	320'	143'	56'	---	---

Table V-1, continued

	Existing 1982	Projected 2000	CNEL at 50 Feet			Distance to Contour Lines, 1982					Distance to Contour Lines, 2000				
			1982	2000	Change	60dB	65dB	70dB	75dB	80dB	60dB	65dB	70dB	75dB	80dB
CHESTER AVENUE															
Ming to Brundage	13,500	44,100	67.5 dB	72.5 dB	+5.0 dB	200'	83'	---	---	---	428'	200'	83'	---	---
Brundage to California	19,000	46,100	68.5	72.5	+4.0	235'	100'	---	---	---	428'	200'	83'	---	---
California to 34th	25,500	40,000	70.0	72.0	+2.0	300'	130'	50'	---	---	395'	185'	75'	---	---
34th to Roberts	19,900	38,400	69.0	72.0	+3.0	255'	110'	---	---	---	395'	185'	75'	---	---
CHESTER AVENUE (SOUTH)															
Union to Planz	4,600	30,100	64.0	71.0	+7.0	110'	---	---	---	---	340'	155'	62'	---	---
Planz to Ming	9,600	30,100	66.0	71.0	+5.0	155'	62'	---	---	---	340'	155'	62'	---	---
COLUMBUS STREET															
Chester to Union	9,900	15,300	66.5	67.5	+1.0	170'	69'	---	---	---	200'	83'	---	---	---
Union to River	10,100	19,400	66.5	68.5	+2.0	170'	69'	---	---	---	235'	100'	---	---	---
River to Mt. Vernon	17,800	24,600	68.5	70.0	+1.5	235'	100'	---	---	---	300'	130'	50'	---	---
Mt. Vernon to Oswell	10,200	21,300	66.5	69.0	+2.5	170'	69'	---	---	---	255'	110'	---	---	---
Oswell to Panorama	8,300	20,000	66.0	69.0	+3.0	155'	62'	---	---	---	255'	110'	---	---	---
COTTONWOOD ROAD															
Panama to White	1,100	9,200	59.0	66.0	+7.0	---	---	---	---	---	155'	62'	---	---	---
White to Casa Loma	6,100	16,000	64.5	68.5	+4.0	120'	---	---	---	---	235'	100'	---	---	---
Casa Loma to Brundage	10,000	20,000	66.5	69.5	+3.0	170'	69'	---	---	---	278'	120'	---	---	---
N. of Brundage (Lakeview Ave.)	6,900	24,500	65.0	70.5	+5.5	130'	50'	---	---	---	320'	143'	56'	---	---
EDISON HIGHWAY															
Truxtun to Fairfax	8,000	28,000	67.0	72.0	+5.0	185'	75'	---	---	---	395'	185'	75'	---	---
FAIRFAX ROAD															
Rt. 58 to Niles	6,700	18,400	65.0	69.0	+4.0	130'	50'	---	---	---	255'	110'	---	---	---
Niles to College	3,300	17,400	62.0	68.5	+6.5	75'	---	---	---	---	235'	100'	---	---	---
College to Rt. 178 (proposed)	---	16,500	----	68.5	---	---	---	---	---	---	235'	100'	---	---	---
N. of Rt. 178 (proposed)	---	10,800	----	68.5	---	---	---	---	---	---	235'	100'	---	---	---
GOSFORD ROAD															
Panama to Ming	3,500	28,100	63.5	70.5	+7.0	100'	---	---	---	---	320'	143'	56'	---	---
Ming to Rt. 178 (proposed)	11,000	36,800	66.5	71.5	+5.0	170'	69'	---	---	---	368'	170'	69'	---	---
N. of Rt. 178 (proposed)	9,600	32,000	66.0	71.0	+5.0	155'	62'	---	---	---	340'	155'	62'	---	---

Table V-1, continued

	Existing 1982	Projected 2000	CNEL at 50 Feet			Distance to Contour Lines, 1982					Distance to Contour Lines, 2000				
			1982	2000	Change	60dB	65dB	70dB	75dB	80dB	60dB	65dB	70dB	75dB	80dB
"H" STREET															
Panama to White	6,150	18,700	66.0 dB	69.5 dB	+3.5 dB	155'	62'	---	---	---	278'	120'	---	---	---
White to Ming	8,000	27,400	66.5	71.0	+4.5	170'	69'	---	---	---	340'	155'	62'	---	---
Ming to Brundage	13,000	35,100	68.0	72.5	+4.5	215'	90'	---	---	---	428'	200'	83'	---	---
Brundage to California	8,000	29,700	66.5	71.5	+5.0	170'	69'	---	---	---	368'	170'	69'	---	---
California to 24th	11,000	18,400	67.5	69.5	+2.0	200'	83'	---	---	---	278'	120'	---	---	---
24th to Rt. 204	8,000	12,300	66.5	68.0	+1.5	170'	69'	---	---	---	215'	90'	---	---	---
MANOR STREET															
Union to Roberts	17,300	37,700	69.0	72.5	+3.5	255'	110'	---	---	---	428'	200'	83'	---	---
MING AVENUE															
Buena Vista to Gosford (proposed)	---	28,200	----	70.5	---	----	---	---	---	---	320'	143'	56'	---	---
Gosford to Ashe	9,400	37,800	66.0	72.0	+6.0	155'	62'	---	---	---	395'	185'	75'	---	---
Ashe to Wible	27,600	40,200	70.5	72.5	+2.0	320'	143'	56'	---	---	428'	200'	83'	---	---
Wible to Union	10,000	51,000	66.5	73.5	+7.0	170'	69'	---	---	---	490'	235'	100'	---	---
Union to Cottonwood	9,800	27,900	66.5	70.5	+4.0	170'	69'	---	---	---	320'	143'	56'	---	---
MOHAWK ROAD															
North of California	8,000	31,000	66.0	71.0	+5.0	155'	62'	---	---	---	340'	155'	62'	---	---
MT. VERNON AVENUE															
Brundage to California	14,500	28,000	68.0	70.5	+2.5	215'	90'	---	---	---	320'	143'	56'	---	---
California to Rt. 178	18,200	32,000	68.5	71.0	+2.5	235'	100'	---	---	---	340'	155'	62'	---	---
Rt. 178 to Panorama	16,800	32,000	68.5	71.0	+2.5	235'	100'	---	---	---	340'	155'	62'	---	---
NEW STINE ROAD															
Planz to Ming	12,500	44,000	67.5	72.5	+5.0	200'	83'	---	---	---	428'	200'	83'	---	---
Ming to Stockdale	20,000	42,100	69.0	72.5	+3.5	255'	110'	---	---	---	428'	200'	83'	---	---
NILES STREET															
Rt. 178 to Mt. Vernon	9,400	12,000	66.0	67.0	+1.0	155'	62'	---	---	---	185'	75'	---	---	---
Mt. Vernon to Oswell	14,700	13,200	68.0	67.5	-0.5	215'	90'	---	---	---	200'	83'	---	---	---
Oswell to Fairfax	15,100	13,200	68.0	67.5	-0.5	215'	90'	---	---	---	200'	83'	---	---	---
Fairfax to Rt. 184	15,100	16,200	68.0	68.0	0.0	215'	90'	---	---	---	215'	90'	---	---	---

Table V-1, continued

	Existing 1982	Projected 2000	CNEL at 50 Feet			Distance to Contour Lines, 1982					Distance to Contour Lines, 2000				
			1982	2000	Change	60dB	65dB	70dB	75dB	80dB	60dB	65dB	70dB	75dB	80dB
OAK STREET															
Brundage to California	17,000	35,300	68.5 dB	71.5 dB	+3.0 dB	235'	100'	---	---	---	368'	170'	69'	---	---
California to 24th	20,500	42,500	69.0	72.5	+3.5	255'	110'	---	---	---	428'	200'	83'	---	---
OLD RIVER ROAD															
Panama to Ming (proposed)	---	12,100	----	68.0	---	---	---	---	---	---	215'	90'	---	---	---
Ming to Rt. 178 (proposed)	---	18,200	----	70.0	---	---	---	---	---	---	300'	130'	50'	---	---
N. of Rt. 178 (proposed)	---	16,100	----	69.5	---	---	---	---	---	---	278'	120'	---	---	---
OSWELL STREET															
Brundage to Edison Hwy.	7,900	24,000	65.5	70.0	+4.5	143'	56'	---	---	---	300'	130'	50'	---	---
Edison Hwy. to Niles	9,800	21,200	66.0	69.0	+3.0	155'	62'	---	---	---	255'	110'	---	---	---
Niles to Rt. 178	18,000	26,000	68.5	70.0	+1.5	235'	100'	---	---	---	300'	130'	50'	---	---
PALM STREET															
Rt. 99 to Chester	6,900	22,000	65.5	70.5	+5.0	143'	56'	---	---	---	320'	143'	56'	---	---
PANAMA LANE															
East of Ashe	4,200	31,000	63.5	71.0	+7.5	100'	---	---	---	---	340'	155'	62'	---	---
Wible to "H"	3,800	30,000	63.5	71.0	+7.5	100'	---	---	---	---	340'	155'	62'	---	---
East of "H"	4,100	27,700	63.5	70.5	+7.0	100'	---	---	---	---	320'	143'	56'	---	---
East of Union	3,200	15,400	63.0	68.0	+5.0	90'	---	---	---	---	215'	90'	---	---	---
PANORAMA DRIVE															
Union to Mt. Vernon	9,700	12,000	67.0	68.0	+1.0	185'	75'	---	---	---	215'	90'	---	---	---
East of Mt. Vernon	4,700	7,400	65.0	66.5	+1.5	130'	50'	---	---	---	170'	69'	---	---	---
PIERCE ROAD															
North of Rt. 58	12,000	26,800	73.0	76.5	+3.5	460'	215'	90'	---	---	720'	368'	170'	69'	---
RIVER BOULEVARD															
Bernard to Panorama	8,700	15,000	66.0	68.0	+2.0	155'	62'	---	---	---	215'	90'	---	---	---

Table V-1 , continued

	Existing 1982	Projected 2000	CNEL at 50 Feet			Distance to Contour Lines, 1982					Distance to Contour Lines, 2000				
			1982	2000	Change	60dB	65dB	70dB	75dB	80dB	60dB	65dB	70dB	75dB	80dB
ROUTE 58 (AT GRADE)															
West of Rt. 99	24,700	49,500	75.5 dB	79.0 dB	+3.5 dB	640'	320'	143'	56'	---	950'	520'	255'	110'	---
Rt. 99 to Cottonwood	36,500	54,000	77.5	79.5	+2.0	810'	428'	200'	83'	---	1,000'	560'	278'	120'	---
Cottonwood to Mt. Vernon	30,000	48,000	76.5	79.0	+2.5	720'	368'	170'	69'	---	950'	520'	255'	110'	---
ROUTE 58 (BELOW GRADE)															
West of Rt. 99	24,700	49,500	75.5	79.0	+3.5	268'	105'	80'	54'	---	500'	170'	95'	74'	---
Rt. 99 to Cottonwood	36,500	54,000	77.5	79.5	+2.0	405'	130'	88'	67'	---	530'	203'	98'	76'	---
Cottonwood to Mt. Vernon	30,000	48,000	76.5	79.0	+2.5	335'	115'	84'	61'	---	500'	170'	95'	74'	---
ROUTE 58 (ABOVE GRADE)															
West of Rt. 99	24,700	49,500	64.0	67.5	+3.5	640'	310'	---	---	---	950'	520'	200'	---	---
Rt. 99 to Cottonwood	36,500	54,000	66.0	68.0	+2.0	810'	428'	---	---	---	1,000'	560'	240'	---	---
Cottonwood to Mt. Vernon	30,000	48,000	65.0	67.5	+2.0	720'	368'	---	---	---	950'	520'	200'	---	---
ROUTE 99 (AT GRADE)															
Rt. 204 to Rt. 58	69,200	126,200	80.5	84.0	+3.5	1,100'	640'	320'	143'	56'	1,500'	950'	520'	255'	110'
Rt. 58 to Brundage	75,600	141,000	81.0	84.5	+3.5	1,150'	680'	340'	155'	62'	1,575'	1,000'	560'	278'	120'
Brundage to Wible	63,500	126,500	80.5	84.0	+3.5	1,100'	640'	320'	143'	56'	1,500'	950'	520'	255'	110'
Wible to White	46,200	130,700	78.5	84.5	+6.0	905'	490'	235'	100'	---	1,575'	1,000'	560'	278'	120'
White to Panama	35,000	98,000	77.0	82.5	+5.5	760'	395'	185'	75'	---	1,325'	810'	428'	200'	83'
ROUTE 99 (BELOW GRADE)															
Rt. 204 to Rt. 58	69,200	126,200	80.5	84.0	+3.5	595'	268'	105'	80'	54'	850'	500'	170'	95'	74'
Rt. 58 to Brundage	75,600	141,000	81.0	84.5	+3.5	630'	300'	110'	82'	57'	890'	530'	203'	98'	76'
Brundage to Wible	63,500	126,500	80.5	84.0	+3.5	595'	268'	105'	80'	54'	850'	500'	170'	95'	74'
Wible to White	46,200	130,700	78.5	84.5	+6.0	470'	155'	93'	72'	---	890'	530'	203'	98'	76'
White to Panama	35,000	98,000	77.0	82.5	+5.5	370'	120'	86'	64'	---	735'	405'	130'	88'	67'
ROUTE 99 (ABOVE GRADE)															
Rt. 204 to Rt. 58	69,200	126,200	69.0	72.5	+3.5	1,100'	640'	310'	---	---	1,150'	950'	520'	200'	---
Rt. 58 to Brundage	75,600	141,000	69.5	73.0	+3.5	1,150'	680'	340'	---	---	1,575'	1,000'	560'	240'	---
Brundage to Wible	63,500	126,500	69.0	72.5	+3.5	1,100'	640'	310'	---	---	1,500'	950'	520'	200'	---
Wible to White	46,200	130,700	67.0	73.0	+6.0	905'	490'	150'	---	---	1,575'	1,000'	560'	240'	---
White to Panama	35,000	98,000	65.5	71.0	+5.5	260'	395'	---	---	---	1,325'	810'	428'	---	---

Table V-1. continued

	Existing 1982	Projected 2000	CNEL at 50 Feet 1982	CNEL at 50 Feet 2000	CNEL at 50 Feet Change	Distance to Contour Lines, 1982 60dB	65dB	70dB	75dB	80dB	Distance to Contour Lines, 2000 60dB	65dB	70dB	75dB	80dB
ROUTE 178 (AT GRADE)															
W. of Coffee (proposed)	---	41,400	--- dB	78.0 dB	--- dB	---	---	---	---	---	860'	460'	215'	90'	---
Coffee to Mohawk (proposed)	---	46,500	---	79.0	---	---	---	---	---	---	950'	520'	255'	110'	---
Mohawk to Rt. 99 (proposed)	---	49,500	---	79.0	---	---	---	---	---	---	950'	520'	255'	110'	---
Rt. 204 to Beale	33,100	61,000	77.0	80.0	+3.0	760'	395'	185'	75'	---	1,050'	600'	300'	130'	50'
Beale to Mt. Vernon	19,800	58,000	74.5	80.0	+5.5	560'	278'	120'	---	---	1,050'	600'	300'	130'	50'
Mt. Vernon to Oswell	20,700	39,000	75.0	78.0	+3.0	600'	300'	130'	50'	---	860'	460'	215'	90'	---
East of Oswell	7,100	36,400	70.5	77.5	+7.0	320'	143'	56'	---	---	810'	428'	200'	83'	---
Rt. 184 to Alfred Harrell Hwy.	7,500	38,000	70.5	78.0	+7.5	320'	143'	56'	---	---	860'	460'	215'	90'	---
E. of Alfred Harrell Hwy.	7,500	34,000	70.5	77.0	+6.5	320'	143'	56'	---	---	760'	395'	185'	75'	---
ROUTE 178 (BELOW GRADE)															
W. of Coffee (proposed)	---	41,400	---	78.0	---	---	---	---	---	---	440'	140'	90'	69'	---
Coffee to Mohawk (proposed)	---	46,500	---	79.0	---	---	---	---	---	---	500'	170'	95'	74'	---
Mohawk to Rt. 99 (proposed)	---	49,500	---	79.0	---	---	---	---	---	---	500'	170'	95'	74'	---
Rt. 204 to Beale	33,100	61,000	77.0	80.0	+3.0	370'	120'	86'	64'	---	560'	235'	100'	78'	50'
Beale to Mt. Vernon	19,800	58,000	74.5	80.0	+5.5	203'	98'	76'	---	---	560'	235'	100'	78'	50'
Mt. Vernon to Oswell	20,700	39,000	75.0	78.0	+3.0	235'	100'	78'	50'	---	440'	140'	90'	69'	---
East of Oswell	7,100	36,400	70.5	77.5	+7.0	105'	80'	54'	---	---	405'	130'	88'	67'	---
Rt. 184 to Alfred Harrell Hwy.	7,500	38,000	70.5	78.0	+7.5	105'	80'	54'	---	---	440'	140'	90'	69'	---
E. of Alfred Harrell Hwy.	7,500	34,000	70.5	77.0	+6.5	105'	80'	54'	---	---	370'	120'	86'	64'	---
ROUTE 178 (ABOVE GRADE)															
W. of Coffee (proposed)	---	41,400	---	66.5	---	---	---	---	---	---	860'	460'	---	---	---
Coffee to Mohawk (proposed)	---	46,500	---	67.5	---	---	---	---	---	---	950'	520'	195'	---	---
Mohawk to Rt. 99 (proposed)	---	49,500	---	67.5	---	---	---	---	---	---	950'	520'	195'	---	---
Rt. 204 to Beale	33,100	61,000	65.5	68.5	+3.0	760'	400'	---	---	---	1,050'	600'	265'	---	---
Beale to Mt. Vernon	19,800	58,000	63.0	68.5	+5.5	560'	230'	---	---	---	1,050'	600'	265'	---	---
Mt. Vernon to Oswell	20,700	39,000	63.5	66.5	+3.0	600'	265'	---	---	---	860'	460'	---	---	---
East of Oswell	7,100	36,400	59.0	66.0	+7.0	298'	---	---	---	---	810'	430'	---	---	---
Rt. 184 to Alfred Harrell Hwy.	7,500	38,000	59.0	66.5	+7.5	298'	---	---	---	---	860'	460'	---	---	---
E. of Alfred Harrell Hwy.	7,500	34,000	59.0	65.5	+6.5	298'	---	---	---	---	760'	400'	---	---	---
ROUTE 184 (AT GRADE)															
Brundage to Niles	7,200	16,800	70.5	73.0	+2.5	320'	143'	56'	---	---	460'	215'	90'	---	---
Niles to Rt. 178 (proposed)	---	15,100	---	72.5	---	---	---	---	---	---	428'	200'	83'	---	---
East of Niles	7,600	16,100	70.5	73.0	+2.5	320'	143'	56'	---	---	460'	215'	90'	---	---

Table V-1 , continued

	Existing 1982	Projected 2000	CNEL at 50 Feet 1982	CNEL at 50 Feet 2000	CNEL at 50 Feet Change	Distance to Contour Lines, 1982 60dB	65dB	70dB	75dB	80dB	Distance to Contour Lines, 2000 60dB	65dB	70dB	75dB	80dB
ROUTE 184 (BELOW GRADE)															
Brundage to Niles	7,200	16,800	70.5 dB	73.0 dB	+2.5 dB	105'	80'	54'	---	---	140'	90'	69'	---	---
Niles to Rt. 178 (proposed)	---	15,100		72.5	---	---	---	---	---	---	130'	88'	67'	---	---
East of Niles	7,600	16,100	70.5	73.0	+2.5	105'	80'	54'	---	---	140'	90'	69'	---	---
ROUTE 184 (ABOVE GRADE)															
Brundage to Niles	7,200	16,800	59.0	61.5	+2.5	298'	---	---	---	---	460'	---	---	---	---
Niles to Rt. 178 (proposed)	---	15,100	---	61.0	---	---	---	---	---	---	430'	---	---	---	---
East of Niles	7,600	16,100	59.0	61.5	+2.5	298'	---	---	---	---	460'	---	---	---	---
ROUTE 204 (AT GRADE)															
Rt. 99 to "H"	28,700	50,700	76.5	79.0	+2.5	720'	368'	170'	69'	---	950'	520'	255'	110'	---
"H" to Union	20,200	66,300	74.5	80.5	+6.0	560'	278'	120'	---	---	1,100'	640'	320'	143'	56'
ROUTE 204 (BELOW GRADE)															
Rt. 99 to "H"	28,700	50,700	76.5	79.0	+2.5	335'	115'	84'	61'	---	500'	170'	95'	74'	---
"H" to Union	20,200	66,300	74.5	80.5	+6.0	203'	98'	76'	---	---	595'	268'	105'	80'	54'
ROUTE 204 (ABOVE GRADE)															
Rt. 99 to "H"	28,700	50,700	65.0	67.5	+2.5	720'	365'	---	---	---	950'	520'	195'	---	---
"H" to Union	20,200	66,300	63.0	69.0	+6.0	560'	230'	---	---	---	1,100'	640'	298'	---	---
STINE ROAD															
Panama to White	8,300	32,000	66.0	71.0	+5.0	155'	62'	---	---	---	340'	155'	62'	---	---
White to Planz	9,800	38,400	66.0	72.0	+6.0	155'	62'	---	---	---	395'	185'	75'	---	---
North of Planz	8,100	10,000	65.5	66.5	+1.0	143'	56'	---	---	---	170'	69'	---	---	---
STOCKDALE HIGHWAY															
Buena Vista to Gosford	10,000	36,800	69.0	74.0	+5.0	255'	110'	---	---	---	520'	255'	110'	---	---
Gosford to Ashe	20,300	38,000	71.5	74.5	+3.0	368'	170'	69'	---	---	560'	278'	120'	---	---
Ashe to Stine	25,000	41,400	72.5	74.5	+2.0	428'	200'	83'	---	---	560'	278'	120'	---	---
Stine to Rt. 99	21,600	37,200	72.0	74.0	+2.0	395'	185'	75'	---	---	520'	255'	110'	---	---
34TH STREET															
Chester to Union	15,300	20,400	68.0	69.0	+1.0	215'	90'	---	---	---	255'	110'	---	---	---

Table V-1, continued

	Existing 1982	Projected 2000	CNEL at 50 Feet 1982	2000	Change	Distance to Contour Lines, 1982 60dB	65dB	70dB	75dB	80dB	Distance to Contour Lines, 2000 60dB	65dB	70dB	75dB	80dB
TRUXTUN AVENUE															
Gosford to Mohawk	7,400	42,300	67.0 dB	74.0 dB	+7.0 dB	185'	75'	---	---	---	520'	255'	110'	---	---
Mohawk to Rt. 99	7,900	44,200	67.0	74.0	+7.0	185'	75'	---	---	---	520'	255'	110'	---	---
Rt. 99 to "H"	9,000	38,100	67.5	73.5	+6.0	200'	83'	---	---	---	490'	235'	100'	---	---
"H" to Beale	20,000	23,400	70.5	71.0	+0.5	320'	143'	56'	---	---	340'	155'	62'	---	---
24TH STREET															
Rt. 99 to "H"	25,500	61,600	71.5	75.5	+4.0	368'	170'	69'	---	---	640'	320'	143'	56'	---
"H" to Rt. 204	25,500	38,000	71.5	73.5	+2.0	368'	170'	69'	---	---	490'	235'	100'	---	---
UNION AVENUE															
North of Panama	14,500	22,200	69.5	71.0	+1.5	278'	120'	---	---	---	340'	155'	62'	---	---
South of White	14,500	30,200	69.5	72.5	+3.0	278'	120'	---	---	---	428'	200'	83'	---	---
White to Casa Loma	17,000	39,400	70.0	73.5	+3.5	300'	130'	50'	---	---	490'	235'	100'	---	---
Casa Loma to Brundage	17,000	54,200	70.0	75.0	+5.0	300'	130'	50'	---	---	600'	300'	130'	50'	---
Brundage to California	27,000	52,500	71.5	75.0	+3.5	368'	170'	69'	---	---	600'	300'	130'	50'	---
California to Rt. 178	20,000	58,000	70.5	75.5	+5.0	320'	143'	56'	---	---	640'	320'	143'	56'	---
Rt. 178 to Columbus	14,000	26,500	69.5	72.0	+2.5	278'	120'	---	---	---	395'	185'	75'	---	---
WHITE LANE															
W. of Gosford (proposed)	---	18,100	---	68.5	---	---	---	---	---	---	235'	100'	---	---	---
Gosford to "H"	11,700	28,400	67.0	70.5	+3.5	185'	75'	---	---	---	320'	143'	56'	---	---
"H" to Union	5,800	20,500	64.5	69.0	+4.5	120'	---	---	---	---	255'	110'	---	---	---
Union to Cottonwood	1,150	14,400	59.0	67.5	+8.5	---	---	---	---	---	200'	83'	---	---	---
WIBLE ROAD															
Panama to White	3,500	15,900	63.0	68.0	+5.0	90'	---	---	---	---	215'	90'	---	---	---
White to Rt. 99	10,000	32,700	66.5	71.0	+4.5	170'	69'	---	---	---	340'	155'	62'	---	---
Rt. 99 to Ming	8,000	36,400	65.5	71.5	+6.0	143'	56'	---	---	---	368'	170'	69'	---	---
Ming to Brundage	14,500	31,800	68.0	71.0	+3.0	215'	90'	---	---	---	340'	155'	62'	---	---

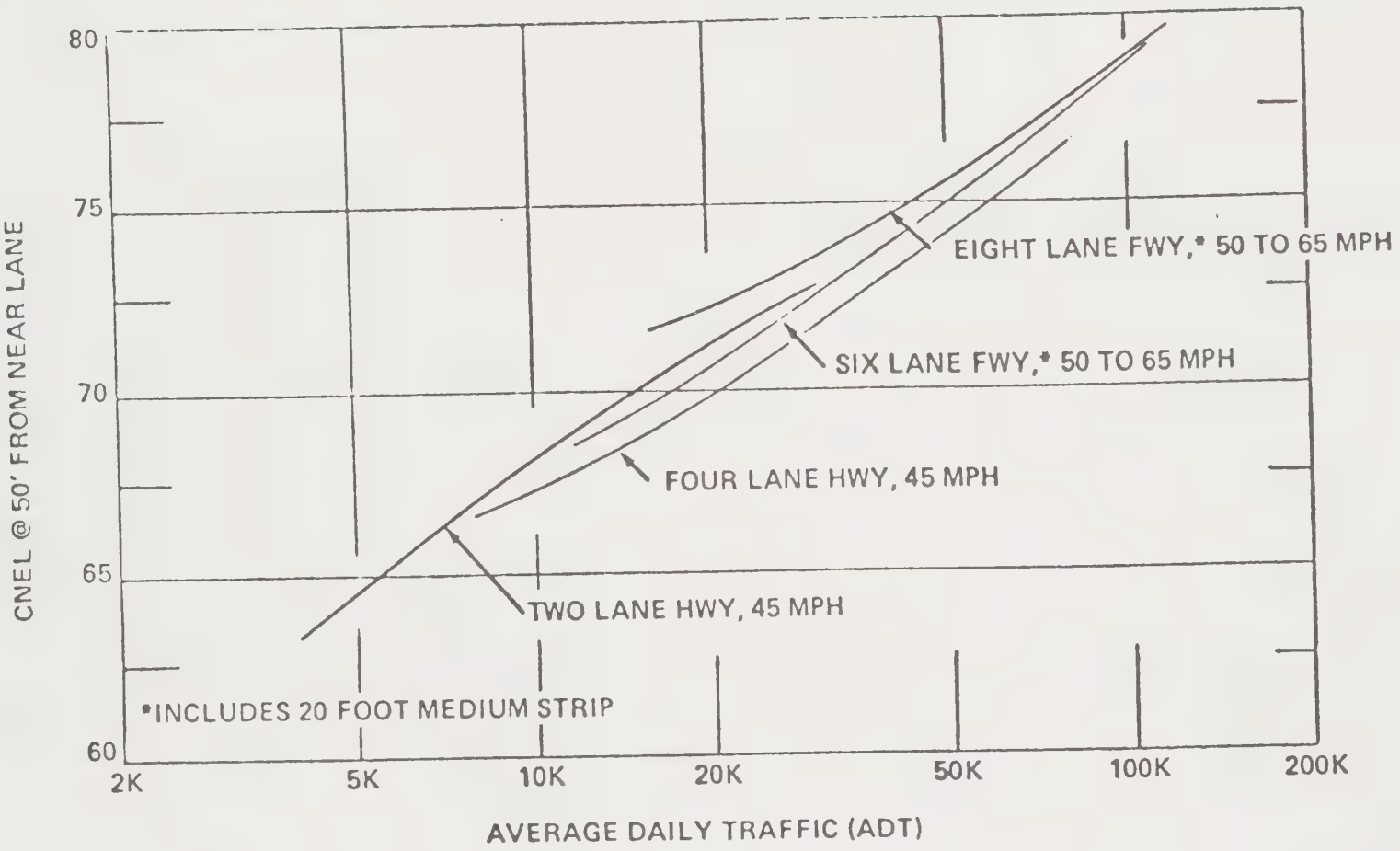


FIGURE V-1. Community Noise Equivalent Level for Traffic Noise (Heavy Truck to Auto Mix of 4%)

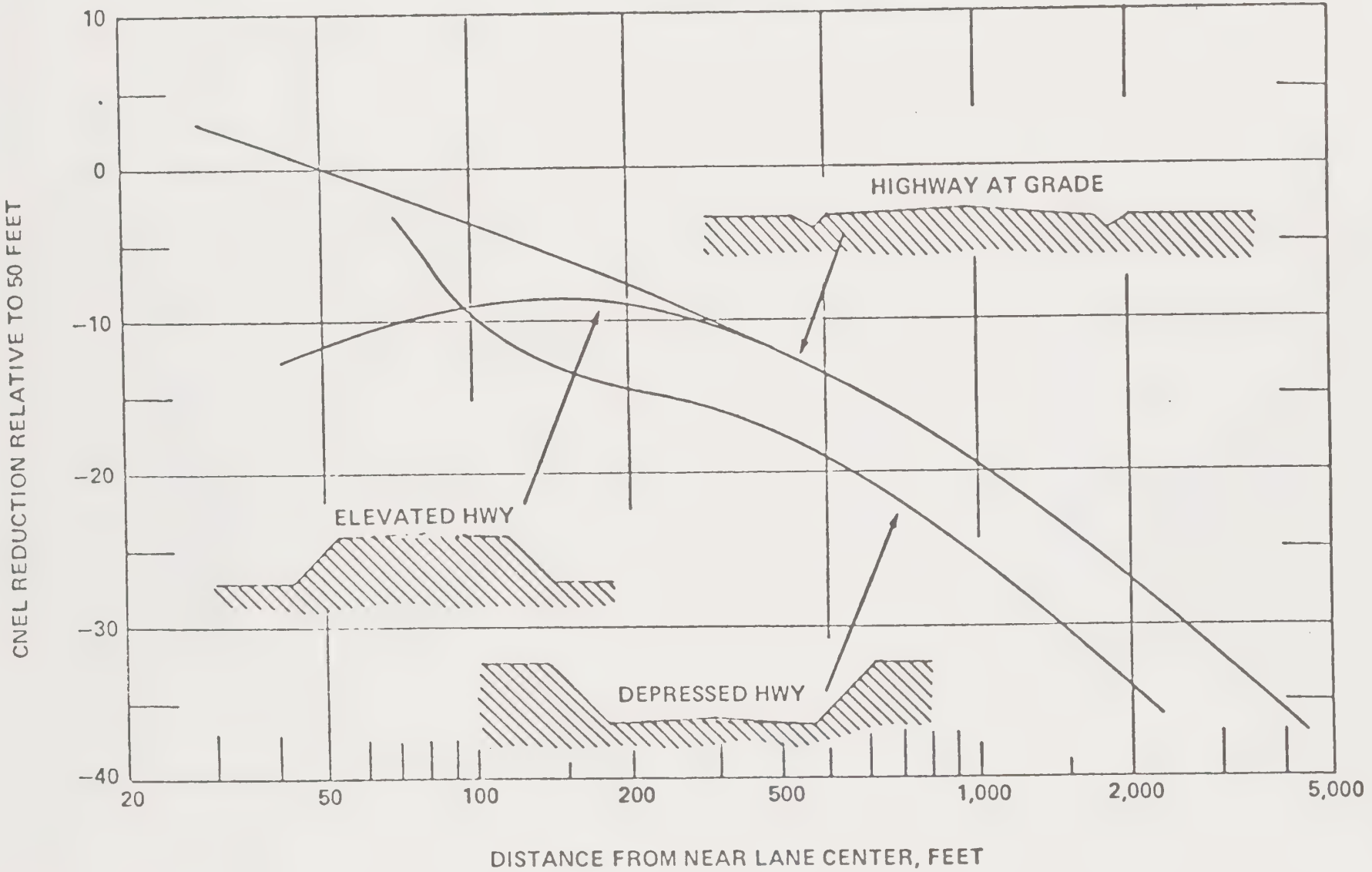


FIGURE V-2. CNEL Reduction for Various Highway Configurations

APPENDIX VI

NOISE CONTROL PROCEDURES FOR RESIDENTIAL CONSTRUCTION

SUPPLEMENT OF THE NOISE ELEMENT

CITY OF BAKERSFIELD
DEVELOPMENT SERVICES DEPARTMENT
NOVEMBER, 1985

APPENDIX VI

Table of Contents

NOISE CONTROL IN RESIDENTIAL CONSTRUCTION

Procedure for Selecting Acceptable Noise Control Measures

STEP 1 SITE EXPOSURE TO NOISE

Project site is exposed to a CNEL which exceeds 60 dB:

If yes, indicate the range of CNEL based on City noise contour map for the projected CNEL contours:

Arterial #1: _____ dB to _____ dB
Arterial #2: _____ dB to _____ dB
Railroad: _____ dB to _____ dB
Airport: _____ dB to _____ dB

STEP 2 RANGE OF CNEL: 60 dB to 65 dB

If the site or a portion of the site is exposed to a CNEL of between 60 and 65 dB generated by arterial traffic, rail movements, aircraft operations or any combination of these sources, the exterior CNEL requirement of the City, which requires the outdoor living space to be 65 dB or less, is met. Within this CNEL range the interior living space will be considered to comply with the City's requirement (CNEL shall not exceed 45 dB) upon incorporation of the Noise Level Reduction (NLR) of 20 dB as indicated in Table 5a, attached. (Refer to Code Sections 6.0 and 8.2.)

STEP 3 RANGE OF CNEL: Exceeds 65 dB

There are three cases which apply for residential sites or the portion of residential sites which exceed 65 dB. These are:

Applicant elects to design using the City specified noise control measures (Code Section 6.1):

Applicant elects to submit an Acoustical Analysis and Design Report (Code Section 6.2):

City requires an Acoustical Analysis and Design Report (which is the case for complex site topography, parallel arterials impacting the site and/or railroad noise which is greater than 65 dB.) (Code Section 6.3 and 6.4):

STEP 4 NOISE BARRIER WALL HEIGHT AND BUILDING CONSTRUCTION

If applicant elects to apply the City's measures the following steps are followed. If applicant elects to submit, or if the City requires the submittal of, an Acoustical Analysis and Design Report, the City compares the findings of the report to those established in the following:

Step 4A Design CNEL

Design based on contour maps:

Arterial 1	_____	dB
Arterial 2	_____	dB
Airport	_____	dB
Railroad	_____	dB

Design CNEL based on Acoustical Analysis and Design Report:

Arterial 1	_____	dB
Arterial 2	_____	dB
Airport	_____	dB
Railroad	_____	dB

Step 4B Average Daily Traffic

Refer to Table 1, select the projected Average Daily Traffic (ADT) for the arterials directly adjacent to the project site:

Arterial 1, ADT:_____ Truck Mix:_____%

Arterial 2, ADT:_____ Truck Mix:_____%

Step 4C Noise Barrier Wall Height

Refer to Table 2, select the appropriate noise barrier wall height required for the particular site geometry, type of arterial, projected ADT and truck mix:

Arterial 1, Wall Height:_____

Arterial 2, Wall Height:_____

Step 4D Noise Reduction Level Required

Refer to Table 3, select the required Noise Level Reduction (NLR) for the arterial type, site geometry, projected ADT and truck mix:

Arterial 1, NLR: _____ dB

Arterial 2, NLR: _____ dB

Note: First floor NLR is 20 dB for each elevation which is protected by the noise barrier wall. NLR found above applies to second floor and first floor spaces which are not protected by the barrier.

Step 4E Extent of Noise Control Construction

Refer to Table 4, select the distance which identifies the extent of the application of the NLR found in Step 4D.

Arterial 1, Distance: _____ feet

Arterial 2, Distance: _____ feet

The NLR found in Step 4D is to be applied to the second floor of homes constructed between the noise barrier and this distance. First floor spaces protected by the barrier require an NLR of 20 dB for homes constructed between the barrier and this distance.

Step 4F Construction Details

Refer to Table 5, select the required residential design noise control measures for the NLR found in Step 4D.

STEP 5 BARRIER AND DWELLING DESIGN DETAILS

Refer to Sections 7 and 8 of the Procedures for additional design details and consideration relevant to the selection of noise barrier wall location and the selection of appropriate NLRs.

Draft No. 1351-84
April 20, 1984
(Revised December, 1985)

NOISE CONTROL PROCEDURES FOR RESIDENTIAL CONSTRUCTION WITHIN THE CITY OF BAKERSFIELD

1.0 PURPOSE

The purpose of this Procedure is to establish standards of isolation against noise for areas in the vicinity of arterials, railroads and airports where the exterior community noise equivalent level (CNEL) exceeds 60 dB. The Procedure requires residential developments in such noise impacted areas to be so designed and constructed as to isolate them appropriately from the exterior and interior noise exposures produced by arterial traffic, train pass-bys and aircraft operations.

The application of these procedures is to achieve goals of 45 dB for interior living spaces and 65 dB for exterior living spaces. The procedures represent an attempt to not significantly further increase the cost of housing by using acceptable noise mitigation in certain cases without requiring separate acoustical analysis.

2.0 LIMITATIONS

The provisions of this Procedure shall not require, or be construed to require, residential developments to be designed or constructed contrary to the provisions contained elsewhere in the Zoning and/or Building Codes of the City of Bakersfield.

3.0 SCOPE

The provisions of this Procedure shall apply to residential developments or portions thereof, and additions to existing developments that are constructed after the effective date of this Procedure and that are located where the exterior CNEL exceeds 60 dB. A development that has been designed and constructed to include noise barriers and/or special sound insulation in accordance with this Procedure shall not be altered unless it can be shown that such alterations shall not diminish the noise isolating properties of the development so that the development no longer complies with the noise isolation provisions contained in this Procedure.

4.0 DEFINITIONS

Certain terms used in this Procedure are defined as follows:

4.1 Sound Level. In decibels, the quantity measured by an instrument that satisfies American National Standard Specification for Sound Level Meters S1.4-1971 or the most recent revision thereof. Sound level is understood to be measured with the A-weighted filter and slow response of the instrument.

4.2 Sound Transmission Loss of a Partition. A measure of the sound insulating properties of a wall, floor, ceiling, window, or door that is a characteristic of the partition itself and not the room of which it is a part. The determination of sound transmission loss of a partition in the field is described in "Measurement of Airborne Sound Insulating in Buildings", American Society for Testing and Materials Designation E336-77 or the latest revision thereof.

4.3 Sound Transmission Class (STC) of a Partition. A single-figure rating of the sound insulating properties of a partition which takes into account the relative importance of the sound transmission loss of the partition at different frequencies. The determination of the sound transmission class of a partition is described in "Determination of Sound Transmission Class", American Society for Testing and Materials Designation E413-73.

4.4 Noise Level Reduction (NLR). Difference in noise level from outside to inside of the building. NLR is a difference, in decibels, between A-weighted sound level. It depends primarily on the nature of the wall, ceiling, windows, doors, and vents, and to a lesser extent on the amount of sound absorbing material in the room in which the sound is received. It shall be measured, if so required by the Building Official, in a completed and furnished building by application of the testing procedure described in this Procedure.

4.5 Sound Absorption. Capacity of the materials and furnishings in a habitable room to absorb sound.

4.6 Flanking Path. The path of noise propagating around the end(s) of a barrier. This reduces the effectiveness of the barrier in reducing the exterior noise exposure.

4.7 Community Noise Equivalent Level (CNEL). A measure of noise exposure which recognizes that a given level of noise may be more or less tolerable depending on the duration of exposure and the time of day during which the noise is experienced. This measure weights the average noise level for the evening hours (7:00 p.m. to 10:00 p.m.) by 5 dB, and the late evening and early morning hours (10:00 p.m. to 7:00 a.m.) by 10 dB. The unweighted daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value.

4.8 Qualified Consultant. A person who by reason of his training and experience in the science and technology of acoustical engineering is considered qualified to pass judgment on acoustical design, materials, and methods of construction for the attenuation of noise. The qualifications of the consultant relative to acoustical design must be submitted to and found to be acceptable by the City Building Official and the State Office of Noise Control.

5.0 EXTERIOR AND INTERIOR NOISE STANDARDS

Residential projects shall be designed and constructed to cause isolation against the noise produced by arterial traffic, train pass-bys, and/or aircraft operations. The isolation provided by barriers and/or suitable building construction shall reduce the noise of these sources as follows:

5.1 Exterior Living Space. The exterior living space of each residential unit shall not be exposed to a CNEL which exceeds 65 dB.

5.2 Interior Living Space. Any habitable room within the residential unit, with doors and windows closed, shall not be exposed to a CNEL which exceeds 45 dB.

6.0 NOISE IMPACTED PROJECTS

Residential projects or portions thereof, which are exposed to a CNEL of 60 dB or greater shall be declared to be impacted by excessive noise. Such projects or portions of projects shall be required to include noise isolation design and construction such that the exterior and interior noise standards of Section 5.0 shall not be exceeded. Year 2000 CNEL contour maps maintained by the Planning Department shall be used to identify those areas in proximity to arterials, railroads, and/or airports, which are impacted by a CNEL which is 60 dB or greater.

6.1 Performance Standard. Acceptable standards of noise barrier and building construction are provided in Sections 7.0 and 8.0. A residential development will be considered acceptable by the Building Official for mitigating exterior and interior noise exposures if it incorporates the features described in Sections 7.0 and 8.0. Alternate materials and methods of construction may be permitted provided such alternatives are demonstrated to the satisfaction of the Building Official to be equivalent to those described.

6.2 Acoustical Analysis and Design Report. The applicant may elect to have a qualified architect or engineer examine the noise levels and needed noise barrier requirement and the noise control construction details for a proposed residential site. The analysis and design report signed by and prepared under the supervision of a qualified architect or engineer shall be submitted with the application for building permit. The report shall show the topographical relationship of the noise source, the barrier, and the building site; identify the noise sources and characteristics; provide the predicted noise spectra; indicate the basis for the prediction (measured or obtained from published data); and quantify the effectiveness of the proposed barrier and building construction as needed to ensure that the prescribed exterior CNEL of 65 dB and interior CNEL of 45 dB are met within the exterior and interior living spaces.

6.3 Acoustical Analysis Report Required. If, in the opinion of the Building Official, the noise barrier and/or building construction of Sections 7.0 or 8.0 may be inadequate to meet the standards of Section 5.0, an Acoustical Analysis and Design Report shall be requested. The report shall be prepared by a qualified architect or engineer and submitted with the application for a building permit as described in Section 6.2.

6.4 Exclusions to the Procedure. The following cases do not lend themselves to the provisions of the Procedure and, therefore, require an Acoustical Analysis and Design Report as described in Section 6.2.

6.4.1 Residential projects located where the CNEL contour generated by railroad operations or a switching yard exceeds 65 dB.

6.4.2 Residential projects impacted by parallel or near parallel arterials where the 60 dB CNEL contour of one arterial overlaps the 60 dB contour of another (e.g., a major arterial is adjacent to and parallel to a freeway or State Highway). This overlapping may be verified with the information provided in Table 1. Note: This exclusion does not apply to arterials intersecting in a perpendicular or near-perpendicular manner (refer to Section 7.7).

6.4.3 Residential projects with required second floor balconies which are a part of the exterior living space of the unit and which are located where the projected CNEL is greater than 65 dB.

6.4.4 Residential projects with first floor patios located within a 65 dB CNEL contour if such patios are to be protected by individual walls.

6.4.5 Projects impacted by multiple noise sources (e.g., a major arterial and an airport.)

6.4.6 Projects located within a 65 dB contour of an airport.

6.4.7 Projects impacted by freeways and State highways, other than those sections indicated in Table 2, or arterials with a projected ADT in excess of 60,000 vehicles.

6.4.8 Projects adjacent to arterials whose geometry differs from that assumed in this procedure (City of Bakersfield major and secondary arterials, 1964 and 1969; and State highway geometries illustrated in Tables 2e through 2o).

6.4.9 Projects adjacent to an on- or off-ramp of a freeway or State highway.

6.4.10 Projects where a Noise Level Reduction (NLR) in excess of 30 dB is required in order to comply with the interior noise exposure standards.

7.0 NOISE BARRIER CONSTRUCTION

Construction details specified in this section are, for the purposes of this Procedure, considered to meet the exterior noise standard indicated in Section 5.0. Each item indicated in this section shall be identified on the site plan which is submitted with the permit application.

7.1 Noise Barrier Height. For residential projects located adjacent to an arterial, the barrier height shall be at least the height indicated in Tables 2a through 2o for the appropriate geometry, projected average daily traffic volume (ADT), and truck mix indicated in Table 1. All barrier heights are relative to the pad elevation or the arterial elevation, whichever is greater, unless otherwise noted in Tables 2a through 2o. The total barrier height may be made up of any combination of wall material and berm. For example, to achieve a 10 foot noise barrier, a 6 foot wall may be placed on a 4 foot earth berm.

7.2 Application of the Tables. There shall be no interpolation of wall heights from the values indicated in Tables 2a through 2o. For intermediate values of ADT, the next highest value indicated in the table shall be used. For geometries which are similar to those indicated in the tables, but which differ in terms of the relative elevation of the pad to the arterial, the greater barrier height shall be used. For geometries which differ significantly from those indicated in Tables 2a through 2o, an acoustical analysis report shall be required per Section 6.2.

7.3 Continuous Barriers. All noise barriers shall be continuous structures without gaps or openings of any kind.

7.4 Gates. All gates shall be designed to form a continuous barrier to the traffic noise when closed. Generous stops shall be placed at each side and at the bottom of the gate and the gate shall extend to the top of the noise barrier wall or a panel shall be placed above the gates to form a continuous seal. The gate shall be of wood-on-wood construction, or equivalent, with the individual boards overlapping to eliminate gaps.

7.5 Barrier Construction. Barriers shall be constructed of a material that is impervious to noise (e.g., concrete or cinder block or stucco-on-wood studs with R-11 insulation between the studs).

7.6 Flanking Path Control. Barriers shall be configured to protect the entire exterior living space. Therefore, where necessary, the barrier shall be extended along the lot lines, perpendicular to the arterial and/or constructed at the top-of-slope of side-by-side lots which have different pad elevations. These measures are required to prevent the flanking of sound around the barrier. These "flanking" barriers shall be extended for the depth of the exterior living space or to the location of the 65 dB contour line (as indicated in Table 1), whichever is less.

7.7 Projects At or Near an Intersection. Where a project is located at or near the intersection of two arterials, each noise source shall be considered separately. That is, a barrier shall be placed adjacent to both noise sources with barrier heights as indicated in Tables 2a through 2o.

8.0 INTERIOR NOISE CONTROL

All residential buildings located within a CNEL contour of 60 dB or greater shall be designed to cause isolation against exterior noise with at least a Noise Level Reduction (NLR) that will reduce the exterior noise to an acceptable level. The intent is to cause residential buildings to be constructed with sufficient sound insulation so that in any habitable room, furnished for normal use and with doors and windows closed, the noise exposure due to exterior sources does not exceed a CNEL of 45 dB.

8.1 Minimum Noise Level Reduction. The minimum NLR required is specified in Tables 3a through 3o for various project configurations, traffic volumes and truck mixes.

8.2 Extent of Interior Noise Control. Tables 4a through 4o specify the distance from the barrier to the furthest residential dwelling which must be constructed with an NLR as indicated in Tables 3a through 3o.

8.3 Setback of Dwelling to Barrier. The setback of the nearest interior living space from the barrier wall is assumed to be 40 feet but no less than 30 feet. For project configurations where the minimum setback is between 20 and 30 feet the NLR required for the second floor living space should be increased by 5 dB. Where the minimum setback is between 15 and 20 feet the second floor NLR should be increased by 10 dB. Where the minimum setback of a two story dwelling is less than 15 feet an Acoustical Analysis and Design Report is required as described in Section 6.2.

8.4 Residential Construction Details. Construction details specified in Tables 5a through 5e, for the purposes of this Procedure, are considered to meet the interior noise standard specified in Section 5.0. These tables specify the construction required to meet the minimum NLR's indicated in Tables 3a through 3o as limited by the distance from barrier found from Table 4a through 4o.

8.5 Residential Projects Near an Airport or Railroad. Projects within the 60 dB to 65 dB CNEL range of an airport or railroad require an interior noise level reduction (NLR) of 20 dB as is indicated in Table 5a. (Refer to Section 8.0.) No exterior noise control is required for areas where the CNEL is 65 dB or less as identified on the noise contour maps maintained by the Planning Department.

9.0 FIELD INSPECTION OF THE COMPLETED PROJECT

When inspection indicates that the noise barriers and/or building construction is not in accordance with the approved design, field testing by the applicant shall be required. Interior and exterior noise measurements shall be taken under normal conditions. A test report signed by and prepared under the supervision of a Registered Engineer or Registered Architect of the State of California showing compliance or non-compliance with the prescribed interior and exterior allowable levels shall be submitted to the Building Official.

10.0 COMPLAINT ALLEGING NON-COMPLIANCE

When a written complaint is submitted to the Building Official alleging non-compliance with the interior and/or exterior CNEL standards, the Official shall direct that field testing be conducted. The complainant shall post a bond or adequate funds in escrow for the cost of such testing. Such costs shall be chargeable to the complainant when the field tests show compliance with the standards is in fact present. If such tests show non-compliance, then

such testing costs shall be borne by the permit applicant and the development shall be altered as required to comply with the standards at the expense of the permit applicant.

11.0 FIELD TEST PROCEDURE

The field test procedure which is to be followed in the event that an evaluation of the development is required by the Building Official is provided in this section. Alternates to this procedure may be submitted to the Building Official prior to the initiation of a field test. Field tests should not be undertaken pursuant to the provisions of the Procedure prior to the approval of such alternates by the Building Official.

11.1 Interior Sound Level. The interior sound level shall be measured within a habitable room or rooms of the building. The room or rooms nearest to the noise source shall be selected. Indoor measurements shall be obtained at a point 5 feet above the floor of the room or rooms, 3 feet from the window nearest the noise source with curtain (if any) fully opened. The measurement position shall be midway between the sides of the window. Heaters, air conditioners, and other equipment shall be inoperative during the measurement period. Tests shall be conducted in rooms with carpets and furnishings.

11.2 Exterior Sound Level. The exterior sound level shall be measured at a location away from the building (at least 10 feet from any sound reflecting surface). The location should be in a direction from the building nearest to the noise source. The microphone shall be positioned 5 feet above the ground.

11.3 Analysis of Data. The interior and exterior CNEL shall be recorded for a continuous 24-hour period. The difference between the exterior and interior CNEL shall also be recorded on the data sheet submitted to the Building Official. This is the Noise Level Reduction (NLR) of the building construction.

11.4 Documentation. The Report of Findings shall include the following:

11.4.1 Hard copy of instrument print-outs of all measurements.

11.4.2 Tabulation of the interior and exterior hourly noise levels, sound level differences, and calculation of the interior and exterior CNELs.

11.4.3 Evidence of calibration of equipment before and after test.

11.4.4 A certification that the measurements are true and correct.

Table 1. Projected ADT, Truck Mix, and Distance to Projected CNEL Contour Lines for Arterials within the City of Bakersfield.

	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
ALFRED HARRELL HIGHWAY							
China Grade Loop to Hart Park	7,400	3.5%	170'	69'	--	--	--
North of Route 178	4,000	3.5%	100'	--	--	--	--
ASHE ROAD							
Panama to Stockdale (proposed)	16,000	3.5%	215'	90'	--	--	--
BEALE AVENUE							
Truxtun to River	17,800	7%	300'	130'	50'	--	--
BELLE TERRACE							
New Stine to Wible	24,100	3.5%	300'	130'	50'	--	--
Wible to Union	25,200	3.5%	300'	130'	50'	--	--
BERNARD STREET							
Union to River	15,000	3.5%	215'	90'	--	--	--
River to Mt. Vernon	9,600	3.5%	155'	62'	--	--	--
BRUNDAGE LANE							
Oak to Chester	27,000	7%	368'	170'	69'	--	--
Chester to Union	25,100	7%	368'	170'	69'	--	--
Union to Cottonwood	22,600	7%	340'	155'	62'	--	--
Cottonwood to Mt. Vernon	18,100	7%	300'	130'	50'	--	--
CALIFORNIA AVENUE							
Stockdale to Route 99	45,600	7%	520'	255'	110'	--	--
East of Route 99	42,900	7%	520'	255'	110'	--	--
West of Chester	39,200	7%	490'	235'	100'	--	--
Chester to Union	48,100	7%	520'	255'	110'	--	--
Union to Mt. Vernon	22,000	7%	340'	155'	62'	--	--
CASA LOMA DRIVE							
Union to Cottonwood	27,900	3.5%	320'	143'	56'	--	--

Table 1. Con't.

	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
CHESTER AVENUE							
Ming to Brundage	44,100	3.5%	428'	200'	83'	--	--
Brundage to California	46,100	3.5%	428'	200'	83'	--	--
California to 34th	40,000	3.5%	395'	185'	75'	--	--
34th to Roberts	38,400	3.5%	395'	185'	75'	--	--
CHESTER AVENUE (SOUTH)							
Union to Planz	30,100	3.5%	340'	155'	62'	--	--
Planz to Ming	30,100	3.5%	340'	155'	62'	--	--
COLUMBUS STREET							
Chester to Union	15,300	3.5%	200'	83'	--	--	--
Union to River	19,400	3.5%	235'	100'	--	--	--
River to Mt. Vernon	24,600	3.5%	300'	130'	50'	--	--
Mt. Vernon to Oswell	21,300	3.5%	255'	110'	--	--	--
Oswell to Panorama	20,000	3.5%	255'	110'	--	--	--
COTTONWOOD ROAD							
Panama to White	9,200	3.5%	155'	62'	--	--	--
White to Casa Loma	16,000	3.5%	235'	100'	--	--	--
Casa Loma to Brundage	20,000	3.5%	278'	120'	--	--	--
N. of Brundage (Lakeview Ave.)	24,500	3.5%	320'	143'	56'	--	--
EDISON HIGHWAY							
Truxtun to Fairfax	28,000	5%	395'	185'	75'	--	--
FAIRFAX ROAD							
Route 58 to Niles	18,400	3.5%	255'	110'	--	--	--
Niles to College	17,400	3.5%	235'	100'	--	--	--
College to Route 178 (proposed)	16,500	3.5%	235'	100'	--	--	--
N. of Route 178 (proposed)	10,800	3.5%	235'	100'	--	--	--
GOSFORD ROAD							
Panama to Ming	28,100	3.5%	320'	143'	56'	--	--
Ming to Route 178 (proposed)	36,800	3.5%	368'	170'	69'	--	--
N. of Route 178 (proposed)	32,000	3.5%	340'	155'	62'	--	--

Table 1. Con't.

	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
"H" STREET							
Panama to White	18,700	3.5%	278'	120'	--	--	--
White to Ming	27,400	3.5%	340'	155'	62'	--	--
Ming to Brundage	35,100	3.5%	428'	200'	83'	--	--
Brundage to California	29,700	3.5%	368'	170'	69'	--	--
California to 24th	18,400	3.5%	278'	120'	--	--	--
24th to Route 204	12,300	3.5%	215'	90'	--	--	--
MANOR STREET							
Union to Roberts	37,700	3.5%	428'	200'	83'	--	--
MING AVENUE							
Buena Vista to Gosford (proposed)	28,200	3.5%	320'	143'	56'	--	--
Gosford to Ashe	37,800	3.5%	395'	185'	75'	--	--
Ashe to Wible	40,200	3.5%	428'	200'	83'	--	--
Wible to Union	51,000	3.5%	490'	235'	100'	--	--
Union to Cottonwood	27,900	3.5%	320'	143'	56'	--	--
MOHAWK ROAD							
North of California	31,000	3.5%	340'	155'	62'	--	--
MT. VERNON AVENUE							
Brundage to California	28,000	3.5%	320'	143'	56'	--	--
California to Route 178	32,000	3.5%	340'	155'	62'	--	--
Route 178 to Panorama	32,000	3.5%	340'	155'	62'	--	--
NEW STINE ROAD							
Planz to Ming	44,000	3.5%	428'	200'	83'	--	--
Ming to Stockdale	42,100	3.5%	428'	200'	83'	--	--
NILES STREET							
Route 178 to Mt. Vernon	12,000	3.5%	185'	75'	--	--	--
Mt. Vernon to Oswell	13,200	3.5%	200'	83'	--	--	--
Oswell to Fairfax	13,200	3.5%	200'	83'	--	--	--
Fairfax to Route 184	16,200	3.5%	215'	90'	--	--	--
OAK STREET							
Brundage to California	35,300	3.5%	368'	170'	69'	--	--
California to 24th	42,500	3.5%	428'	200'	83'	--	--

Table 1. Con't.

	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
OLD RIVER ROAD							
Panama to Ming (proposed)	12,100	3.5%	215'	90'	--	--	--
Ming to Route 178 (proposed)	18,200	3.5%	300'	130'	50'	--	--
N. of Route 178 (proposed)	16,100	3.5%	278'	120'	--	--	--
OSWELL STREET							
Brundage to Edison Hwy.	24,000	3.5%	300'	130'	50'	--	--
Edison Hwy. to Niles	21,200	3.5%	255'	110'	--	--	--
Niles to Route 178	26,000	3.5%	300'	130'	50'	--	--
PALM STREET							
Route 99 to Chester	22,000	3.5%	320'	143'	56'	--	--
PANAMA LANE							
East of Ashe	31,000	3.5%	340'	155'	62'	--	--
Wible to "H"	30,000	3.5%	340'	155'	62'	--	--
East of "H"	27,700	3.5%	320'	143'	56'	--	--
East of Union	15,400	3.5%	215'	90'	--	--	--
PANORAMA DRIVE							
Union to Mt. Vernon	12,000	3.5%	215'	90'	--	--	--
East of Mt. Vernon	7,400	3.5%	170'	69'	--	--	--
PIERCE ROAD							
North of Route 58	26,800	25%	720'	368'	170'	69'	--
RIVER BOULEVARD							
Bernard to Panorama	15,000	3.5%	215'	90'	--	--	--
ROUTE 58 (AT GRADE)							
West of Route 99	49,500	16%	950'	520'	255'	110'	--
Route 99 to Cottonwood	54,000	16%	1,000'	560'	278'	120'	--
Cottonwood to Mt. Vernon	48,000	16%	950'	520'	255'	110'	--
ROUTE 58 (BELOW GRADE)							
West of Route 99	49,500	16%	500'	170'	95'	74'	--
Route 99 to Cottonwood	54,000	16%	530'	203'	98'	76'	--
Cottonwood to Mt. Vernon	48,000	16%	500'	170'	95'	74'	--

Table 1. Con't.

	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
ROUTE 58 (ABOVE GRADE)							
West of Route 99	49,500	16%	950'	520'	200'	--	--
Route 99 to Cottonwood	54,000	16%	1,000'	560'	240'	--	--
Cottonwood to Mt. Vernon	48,000	16%	950'	520'	200'	--	--
ROUTE 99 (AT GRADE)							
Route 204 to Route 58	126,200	23.4%	1,650'	1,050'	600'	300'	130'
Route 58 to Brundage	141,000	23.4%	1,750'	1,100'	640'	320'	140'
Brundage to Wible	126,500	23.4%	1,650'	1,050'	600'	300'	130'
Wible to White	130,700	23.4%	1,750'	1,100'	640'	320'	140'
White to Panama	98,000	23.4%	1,450'	900'	500'	230'	100'
ROUTE 99 (BELOW GRADE)							
Route 204 to Route 58	126,200	23.4%	940'	560'	230'	100'	78'
Route 58 to Brundage	141,000	23.4%	980'	600'	270'	105'	80'
Brundage to Wible	126,500	23.4%	940'	560'	230'	100'	78'
Wible to White	130,700	23.4%	980'	600'	270'	105'	80'
White to Panama	98,000	23.4%	820'	460'	150'	92'	72'
ROUTE 99 (ABOVE GRADE)							
Route 204 to Route 58	126,200	23.4%	1,650'	1,050'	600'	270'	--
Route 58 to Brundage	141,000	23.4%	1,750'	1,100'	640'	310'	--
Brundage to Wible	126,500	23.4%	1,650'	1,050'	600'	230'	--
Wible to White	130,700	23.4%	1,750'	1,100'	640'	310'	--
White to Panama	98,000	23.4%	1,450'	900'	500'	150'	--
ROUTE 178 (AT GRADE)							
W. of Coffee (proposed)	41,400	16%	860'	460'	215'	90'	--
Coffee to Mohawk (proposed)	46,500	16%	950'	520'	255'	110'	--
Mohawk to Route 99 (proposed)	49,500	16%	950'	520'	255'	110'	--
Route 204 to Beale	61,000	16%	1,050'	600'	300'	130'	50'
Beale to Mt. Vernon	58,000	16%	1,050'	600'	300'	130'	50'
Mt. Vernon to Oswell	39,000	16%	860'	460'	215'	90'	--
East of Oswell	36,400	15.2%	810'	428'	200'	83'	--
Route 184 to Alfred Harrell Hwy.	38,000	15.2%	860'	460'	215'	90'	--
E. of Alfred Harrell Hwy.	34,000	15.2%	760'	395'	185'	75'	--

Table 1. Con't.

	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
ROUTE 178 (BELOW GRADE)							
W. of Coffee (proposed)	41,400	16%	440'	140'	90'	69'	--
Coffee to Mohawk (proposed)	46,500	16%	500'	170'	95'	74'	--
Mohawk to Route 99 (proposed)	49,500	16%	500'	170'	95'	74'	--
Route 204 to Beale	61,000	16%	560'	235'	100'	78'	--
Beale to Mt. Vernon	58,000	16%	560'	235'	100'	78'	--
Mt. Vernon to Oswell	39,000	16%	440'	140'	90'	69'	--
East of Oswell	36,400	15.2%	405'	130'	88'	67'	--
Route 184 to Alfred Harrell Hwy.	38,000	15.2%	440'	140'	90'	69'	--
E. of Alfred Harrell Hwy.	34,000	15.2%	370'	120'	86'	64'	--
ROUTE 178 (ABOVE GRADE)							
W. of Coffee (proposed)	41,400	16%	860'	460'	--	--	--
Coffee to Mohawk (proposed)	46,500	16%	950'	520'	195'	--	--
Mohawk to Route 99 (proposed)	49,500	16%	950'	520'	195'	--	--
Route 204 to Beale	61,000	16%	1,050'	600'	265'	--	--
Beale to Mt. Vernon	58,000	16%	1,050'	600'	265'	--	--
Mt. Vernon to Oswell	39,000	16%	860'	460'	--	--	--
East of Oswell	36,400	15.2%	810'	430'	--	--	--
Route 184 to Alfred Harrell Hwy.	38,000	15.2%	860'	460'	--	--	--
E. of Alfred Harrell Hwy.	34,000	15.2%	760'	400'	--	--	--
ROUTE 184 (AT GRADE)							
Brundage to Niles	16,800	18.7%	600'	300'	130'	50'	--
Niles to Route 178 (proposed)	15,100	16%	428'	200'	83'	--	--
East of Niles	16,100	16%	460'	215'	90'	--	--
ROUTE 184 (BELOW GRADE)							
Brundage to Niles	16,800	18.7%	230'	100'	78'	50'	--
Niles to Route 178 (proposed)	15,100	16%	130'	88'	67'	--	--
East of Niles	16,100	16%	140'	90'	69'	--	--
ROUTE 184 (ABOVE GRADE)							
Brundage to Niles	16,800	18.7%	600'	270'	--	--	--
Niles to Route 178 (proposed)	15,100	16%	430'	--	--	--	--
East of Niles	16,100	16%	460'	--	--	--	--
ROUTE 204 (AT GRADE)							
Route 99 to "H"	50,700	12.4%	950'	520'	255'	110'	--
"H" to Union	66,300	10.8%	1,100'	640'	320'	143'	56'

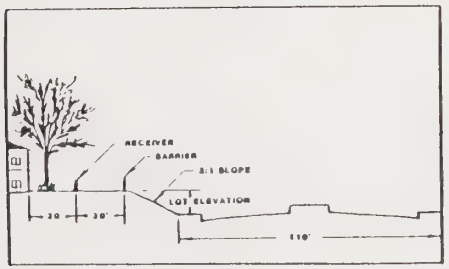
Table 1. Con't.

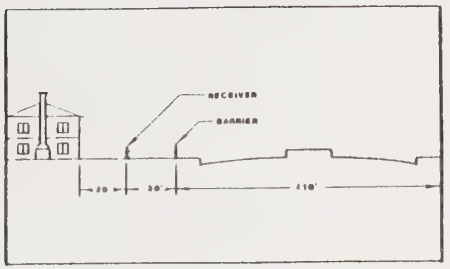
	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
ROUTE 204 (BELOW GRADE)							
Route 99 to "H"	50,700	12.4%	500'	170'	95'	74'	--
"H" to Union	66,300	10.8%	595'	268'	105'	80'	--
ROUTE 204 (ABOVE GRADE)							
Route 99 to "H"	50,700	12.4%	950'	520'	195'	--	--
"H" to Union	66,300	10.8%	1,100'	640'	298'	--	--
STINE ROAD							
Panama to White	32,000	3.5%	340'	155'	62'	--	--
White to Planz	38,400	3.5%	395'	185'	75'	--	--
North of Planz	10,000	3.5%	170'	69'	--	--	--
STOCKDALE HIGHWAY							
Buena Vista to Gosford	36,800	7%	520'	255'	110'	--	--
Gosford to Ashe	38,000	7%	560'	278'	120'	--	--
Ashe to Stine	41,400	7%	560'	278'	120'	--	--
Stine to Route 99	37,200	7%	520'	255'	110'	--	--
34TH STREET							
"H" to Union	20,400	3.5%	255'	110'	--	--	--
TRUXTUN AVENUE							
Gosford to Mohawk	42,300	7%	520'	255'	110'	--	--
Mohawk to Route 99	44,200	7%	520'	255'	110'	--	--
Route 99 to "H"	38,100	7%	490'	235'	100'	--	--
"H" to Beale	23,400	7%	340'	155'	62'	--	--
24TH STREET							
Route 99 to "H"	61,600	7%	640'	320'	143'	56'	--
"H" to Route 204	38,000	7%	490'	235'	100'	--	--
UNION AVENUE							
North of Panama	22,200	10%	390'	180'	74'	--	--
South of White	30,200	10%	520'	250'	110'	--	--
White to Casa Loma	39,400	10%	560'	270'	120'	--	--
Casa Loma to Brundage	54,200	10%	680'	340'	155'	60'	--
Brundage to California	52,500	10%	680'	340'	155'	60'	--
California to Route 178	58,000	7%	640'	320'	143'	56'	--
Route 178 to Columbus	26,500	7%	395'	185'	75'	--	--

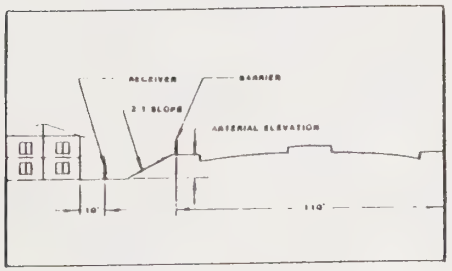
Table 1. Con't.

	Projected ADT	Truck Mix	Distance to Contour Lines 60dB	65dB	70dB	75dB	80dB
WHITE LANE							
W. of Gosford (proposed)	18,100	3.5%	235'	100'	--	--	--
Gosford to "H"	28,400	3.5%	320'	143'	56'	--	--
"H" to Union	20,500	3.5%	255'	110'	--	--	--
Union to Cottonwood	14,400	3.5%	200'	83'	--	--	--
WIBLE ROAD							
Panama to White	15,900	3.5%	215'	90'	--	--	--
White to Route 99	32,700	3.5%	340'	155'	62'	--	--
Route 99 to Ming	36,400	3.5%	368'	170'	69'	--	--
Ming to Brundage	31,800	3.5%	340'	155'	62'	--	--

Table 2a. Wall Heights Required to Mitigate Traffic Noise Impact, Major Arterial (1979), No Setback, 7% Truck Mix



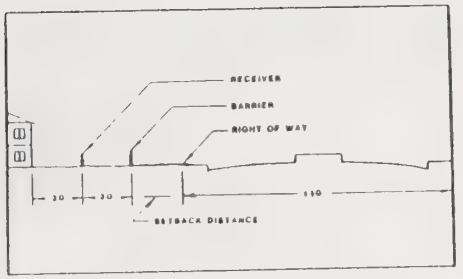




Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
10' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
8' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
6' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'
4' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.0'	7.5'	8.0'
2' Above Grade	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'
At Grade	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.0'	10.5'	11.0'	11.5'
2' Below Grade	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.0'
4' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.0'	8.5'	9.0'
6' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'
8' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'
10' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'

TABLE 2B
WALL HEIGHT

Table 2b. Wall Heights Required to Mitigate Traffic Noise Impact, Major Arterial (1979), Residence at Grade of Arterial, Various Setbacks, 7% Truck Mix



Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
At Grade, 0' Setback	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.0'	10.5'	11.0'	11.5'
At Grade, 10' Setback	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.5'	11.0'
At Grade, 20' Setback	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.5'
At Grade, 40' Setback	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'
At Grade, 80' Setback	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'
At Grade, 160' Setback	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'

NOTE: "Setback distance" is the distance from the arterial right-of-way to the barrier.

Table 2c. Wall Heights Required to Mitigate Traffic Noise Impact, Major Arterial (1979), No Setback, 3.5% Truck Mix

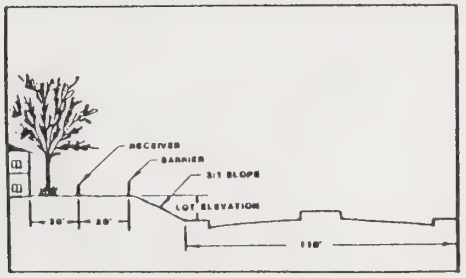
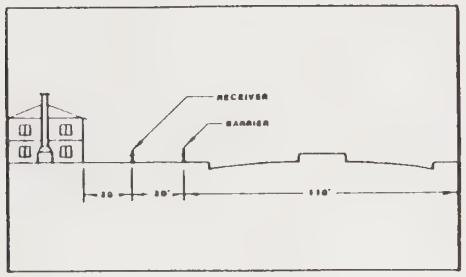
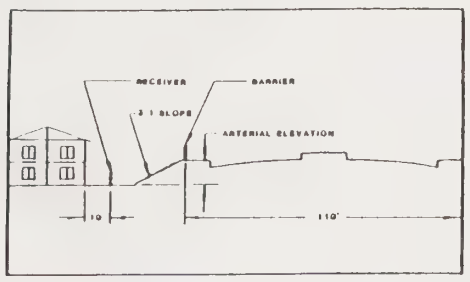
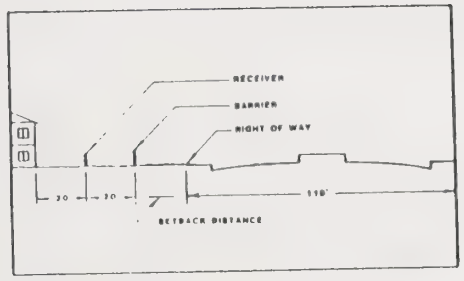
	Projected Average Daily Traffic (ADT)											
Lot Configuration	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
 10' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
8' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
6' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
4' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
2' Above Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'
 At Grade	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'
 2' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.0'
4' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'
6' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
8' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
10' Below Grade	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'

Table 2d. Wall Heights Required to Mitigate Traffic Noise Impact, Major Arterial (1979), Residence at Grade of Arterial, Various Setbacks, 3.5% Truck Mix



Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
At Grade, 0' Setback	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'
At Grade, 10' Setback	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.0'
At Grade, 20' Setback	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.0'	8.5'
At Grade, 40' Setback	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'
At Grade, 80' Setback	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'
At Grade, 160' Setback	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'

NOTE: "Setback distance" is the distance from the arterial right-of-way to the barrier.

TABLE 2E
WALL HEIGHT

Table 2e. Barrier Heights Required to Mitigate Traffic Noise Impact, Route 99, At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)													
	35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	8.0'	8.0'	8.5'	8.5'	9.0'	9.5'	10.0'	10.0'	10.5'	10.5'	11.0'	11.0'	11.5'	11.5'
9%	8.5'	9.0'	9.5'	10.0'	10.0'	10.5'	11.0'	11.5'	11.5'	12.0'	12.0'	12.5'	13.0'	13.0'
12%	9.0'	10.0'	10.0'	10.5'	11.0'	11.5'	12.0'	12.5'	12.5'	13.0'	13.5'	13.5'	14.0'	14.5'
15%	10.0'	10.5'	11.0'	11.5'	12.0'	12.5'	13.0'	13.0'	13.5'	14.0'	14.5'	15.0'	15.0'	15.5'
18%	10.5'	11.0'	11.5'	12.0'	12.5'	13.0'	13.5'	14.0'	14.5'	15.0'	15.5'	16.0'	16.0'	16.5'
21%	11.0'	11.5'	12.5'	13.0'	13.5'	14.0'	14.5'	15.0'	15.5'	16.0'	16.5'	16.5'	17.0'	18.5'
24%	11.5'	12.5'	13.0'	13.5'	14.0'	14.5'	15.0'	15.5'	16.0'	16.5'	17.0'	18.5'	N/A	N/A

TABLE 2F
WALL HEIGHT

Table 2f. Barrier Heights Required to Mitigate Traffic Noise Impact, Route 99, Freeway Elevated 4'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)													
	35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	6.5'	7.0'	7.0'	7.5'	8.0'	8.0'	8.5'	8.5'
9%	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.0'	8.5'	9.0'	9.0'	9.5'	9.5'	10.0'
12%	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'	11.0'	11.0'
15%	7.0'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'	10.0'	10.5'	11.0'	11.5'	11.5'	12.0'	12.5'
18%	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.5'	11.0'	11.5'	12.0'	12.5'	12.5'	13.0'	13.5'
21%	8.0'	8.5'	9.0'	9.5'	10.5'	11.0'	11.5'	12.0'	12.5'	12.5'	13.0'	13.5'	14.0'	15.5'
24%	8.5'	9.0'	10.0'	10.5'	11.0'	11.5'	12.0'	12.5'	13.0'	13.5'	14.0'	15.5'	N/A	N/A

TABLE 2G
WALL HEIGHT

Table 2g. Barrier Heights Required to Mitigate Traffic Noise Impact, Route 99, Fwy. Depressed 4'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	6.5'	7.0'	7.5'	8.0'	8.5'	8.5'	9.0'	9.5'	9.5'	10.0'	10.0'	10.5'	10.5'	11.0'
9%	7.5'	8.0'	8.5'	9.0'	9.5'	9.5'	10.0'	10.5'	11.0'	11.0'	11.5'	11.5'	12.0'	12.5'
12%	8.5'	9.0'	9.5'	10.0'	10.5'	10.5'	11.0'	11.5'	12.0'	12.0'	12.5'	13.0'	13.0'	13.5'
15%	9.0'	9.5'	10.0'	10.5'	11.0'	11.5'	12.0'	12.5'	13.0'	13.0'	13.5'	14.0'	14.5'	14.5'
18%	9.5'	10.5'	11.0'	11.5'	12.0'	12.5'	13.0'	13.0'	13.5'	14.0'	14.5'	15.0'	15.5'	15.5'
21%	10.5'	11.0'	11.5'	12.0'	12.5'	13.0'	13.5'	14.0'	14.5'	15.0'	15.5'	16.0'	16.5'	17.5'
24%	11.0'	11.5'	12.0'	12.5'	13.0'	14.0'	14.5'	15.0'	15.5'	16.0'	16.5'	17.5'	N/A	N/A

TABLE 2H
WALL HEIGHT

Table 2h. Wall Heights Required to Mitigate Traffic Noise Impact, Union Avenue

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 14500	16500	18500	20500	22500	24500	26500	28500	30500
4%	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	7.5'	8.0'
5%	6.0'	6.0'	6.0'	7.0'	7.0'	7.5'	8.0'	8.0'	8.5'
6%	6.0'	6.0'	7.0'	7.5'	8.0'	8.0'	8.5'	8.5'	9.0'
7%	6.0'	7.0'	7.5'	8.0'	8.0'	8.5'	9.0'	9.0'	9.5'
8%	6.5'	7.5'	8.0'	8.0'	8.5'	9.0'	9.0'	9.5'	9.5'
9%	7.0'	8.0'	8.0'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'
10%	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'

TABLE 2I
WALL HEIGHT

Table 2i. Wall Heights Required to Mitigate Traffic Noise Impact, Rt. 178 East of Fairfax, At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)															
	7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.0'	7.5'	7.5'	8.0'	8.0'	8.5'
7%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	7.5'	8.0'	8.5'	8.5'	9.0'	9.0'	9.5'
9%	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	7.5'	7.5'	8.0'	8.5'	8.5'	9.0'	9.0'	9.5'	9.5'	10.0'
11%	6.0'	6.0'	6.0'	6.0'	7.0'	7.5'	8.0'	8.5'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'	10.5'
13%	6.0'	6.0'	6.0'	6.5'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'	10.5'	11.0'	11.0'
15%	6.0'	6.0'	6.5'	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'	11.0'	11.0'	11.5'	11.5'

TABLE 2J
WALL HEIGHT

Table 2j. Wall Heights Required to Mitigate Traffic Noise Impact, Rt. 178 East of Fairfax, Fwy. Elevated 20' *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)															
	7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	9.0'	10.0'	10.5'	10.5'	11.0'	11.5'	11.5'	12.0'	12.0'
7%	6.0'	6.0'	7.0'	7.0'	8.0'	9.0'	10.0'	10.5'	11.0'	11.5'	11.5'	12.0'	12.0'	12.5'	12.5'	13.0'
9%	6.0'	6.5'	7.0'	8.0'	9.5'	10.5'	11.0'	11.5'	11.5'	12.0'	12.5'	12.5'	13.0'	13.0'	13.5'	13.5'
11%	6.5'	7.0'	7.5'	9.5'	10.5'	11.0'	11.5'	12.0'	12.0'	12.5'	13.0'	13.0'	13.5'	14.0'	14.0'	14.5'
13%	7.0'	7.5'	8.5'	10.0'	11.0'	11.5'	12.0'	12.5'	13.0'	13.0'	13.5'	13.5'	14.0'	14.5'	14.5'	15.0'
15%	7.0'	8.0'	10.0'	11.0'	11.5'	12.0'	12.5'	13.0'	13.0'	13.5'	14.0'	14.0'	14.5'	15.0'	15.0'	15.5'

* Wall heights relative to residential pad elevations

TABLE 2K
WALL HEIGHT

Table 2k. Barrier Heights Required to Mitigate Traffic Noise Impact, Rt. 178 East of Fairfax, Fwy. Depressed 20'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
7%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
9%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
11%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
13%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
15%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'

TABLE 2L
WALL HEIGHT

Table 2l. Wall Heights Required to Mitigate Traffic Noise Impact, Rt. 178 East of Rt. 184, Fwy. At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	6.0'	6.0'	6.0'	6.0'	6.0'	7.0'	7.5'	8.0'	8.0'	8.5'	8.5'	9.0'	9.0'	9.5'	9.5'	10.0'
7%	6.0'	6.0'	6.0'	6.5'	7.5'	8.0'	8.5'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'	10.5'	11.0'
9%	6.0'	6.0'	7.0'	7.5'	8.0'	8.5'	9.0'	9.5'	9.5'	10.0'	10.0'	10.5'	11.0'	11.0'	11.5'	11.5'
11%	6.0'	6.5'	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.0'	10.5'	11.0'	11.0'	11.5'	11.5'	12.0'	12.5'
13%	6.0'	7.5'	8.0'	8.5'	9.0'	9.5'	10.0'	10.5'	11.0'	11.0'	11.5'	12.0'	12.0'	12.5'	12.5'	13.0'
15%	7.0'	8.0'	8.5'	9.0'	9.5'	10.0'	10.5'	11.0'	11.5'	11.5'	12.0'	12.5'	12.5'	13.0'	13.5'	13.5'

TABLE 2M
WALL HEIGHT

Table 2m. Wall Heights Required to Mitigate Traffic Noise Impact, Rt. 178 East of Rt. 184, Fwy. Elevated 10' *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)															
	8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	6.5'	7.0'	7.5'	8.5'	9.5'	10.0'	10.5'	11.0'	11.0'	11.5'	12.0'	12.0'	12.5'	12.5'	13.0'	13.0'
7%	7.0'	8.0'	9.0'	10.0'	10.5'	11.0'	11.5'	11.5'	12.0'	12.5'	12.5'	13.0'	13.0'	13.5'	13.5'	14.0'
9%	7.5'	8.5'	10.0'	10.5'	11.0'	11.5'	12.0'	12.5'	13.0'	13.0'	13.5'	13.5'	14.0'	14.5'	14.5'	15.0'
11%	8.0'	10.0'	10.5'	11.5'	12.0'	12.5'	12.5'	13.0'	13.5'	14.0'	14.0'	14.5'	14.5'	15.0'	15.5'	15.5'
13%	9.0'	10.5'	11.0'	12.0'	12.5'	13.0'	13.0'	13.5'	14.0'	14.5'	14.5'	15.0'	15.5'	15.5'	16.0'	16.0'
15%	10.0'	11.0'	11.5'	12.5'	13.0'	13.5'	13.5'	14.0'	14.5'	15.0'	15.0'	15.5'	16.0'	16.5'	16.5'	17.0'

* Wall heights relative to residential pad elevations

TABLE 2N
WALL HEIGHT

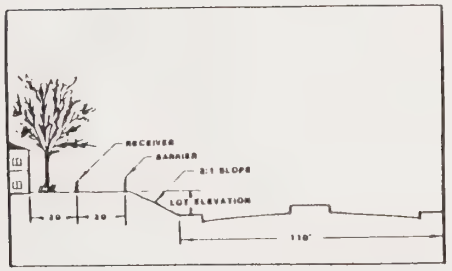
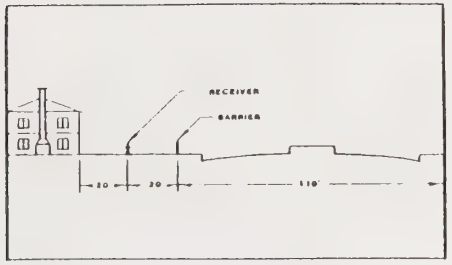
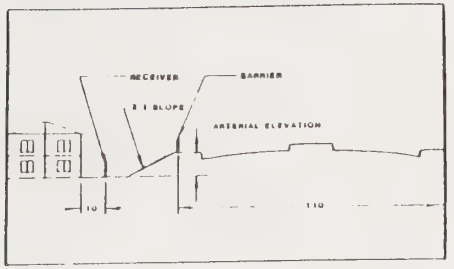
Table 2n. Barrier Heights Required to Mitigate Traffic Noise, Rt. 178 East of Rt. 184, Fwy. Depressed 10'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)															
	8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
7%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
9%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'
11%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'
13%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	6.5'	7.0'
15%	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.0'	6.5'	6.5'	7.0'	7.0'	7.5'

Table 20. Wall Heights Required to Mitigate Traffic Noise Impact, Route 184, At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)										
	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000	17000
7%	6.0'	6.0'	6.0'	6.5'	7.0'	7.5'	8.0'	8.0'	8.5'	8.5'	9.0'
9%	6.0'	6.5'	7.0'	7.5'	8.0'	8.5'	8.5'	9.0'	9.0'	9.5'	9.5'
11%	6.5'	7.5'	8.0'	8.5'	8.5'	9.0'	9.0'	9.5'	9.5'	10.0'	10.0'
13%	7.5'	8.0'	8.5'	9.0'	9.0'	9.5'	9.5'	10.0'	10.0'	10.5'	10.5'
15%	8.0'	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'	10.5'	11.0'	11.0'
17%	8.5'	9.0'	9.0'	9.5'	10.0'	10.0'	10.5'	11.0'	11.0'	11.5'	11.5'
19%	8.5'	9.0'	9.5'	10.0'	10.5'	10.5'	11.0'	11.0'	11.5'	12.0'	12.0'

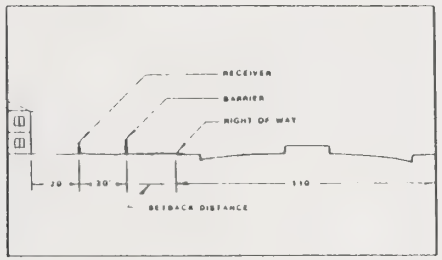
Table 3a. Noise Level Reductions (NLR) Required to Mitigate Traffic Noise Impact at Second Floor Elevations Protected by a Barrier, Major Arterial (1979), No Setback, 7% Truck Mix*

	Lot Configuration	Projected Average Daily Traffic (ADT)											
		5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
	10' Above Grade	20	20	20	20	20	20	20	20	20	25	25	25
	8' Above Grade	20	20	20	20	20	20	20	25	25	25	25	25
	6' Above Grade	20	20	20	20	20	25	25	25	25	25	25	25
	4' Above Grade	20	20	20	25	25	25	25	25	25	25	25	25
	2' Above Grade	20	20	25	25	25	25	25	25	25	25	25	25
	At Grade	20	25	25	25	25	25	25	25	25	25	25	25
	2' Below Grade	20	25	25	25	25	25	25	25	25	25	25	25
	4' Below Grade	20	20	25	25	25	25	25	25	25	25	25	25
	6' Below Grade	20	20	20	25	25	25	25	25	25	25	25	25
	8' Below Grade	20	20	20	20	25	25	25	25	25	25	25	25
	10' Below Grade	20	20	20	20	25	25	25	25	25	25	25	25

* First floor elevations protected by a barrier require a minimum NLR of 20.
First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

Table 3b. Noise Level Reductions (NLR) Required to Mitigate Traffic Noise Impact at Second Floor Elevations Protected by a Barrier, Major Arterial (1979), Residence at Grade of Arterial, Various Setbacks, 7% Truck Mix*



Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
At Grade, 0' Setback	20	25	25	25	25	25	25	25	25	25	25	25
At Grade, 10' Setback	20	20	25	25	25	25	25	25	25	25	25	25
At Grade, 20' Setback	20	20	25	25	25	25	25	25	25	25	25	25
At Grade, 40' Setback	20	20	25	25	25	25	25	25	25	25	25	25
At Grade, 80' Setback	20	20	25	25	25	25	25	25	25	25	25	25
At Grade, 160' Setback	20	20	20	20	25	25	25	25	25	25	25	25

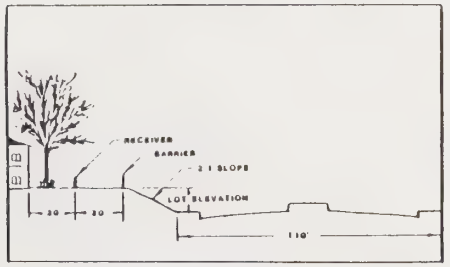
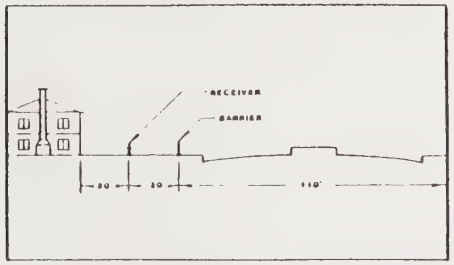
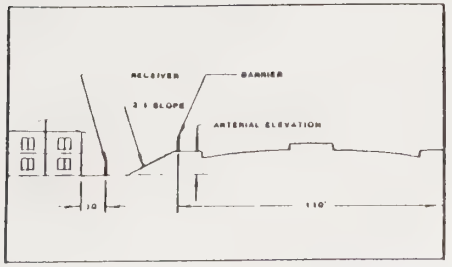
* First floor elevations protected by a barrier require a minimum NLR of 20.
First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

NOTE: "Setback distance" is the distance from the arterial right-of-way to the barrier.

TABLE 3C
NLR

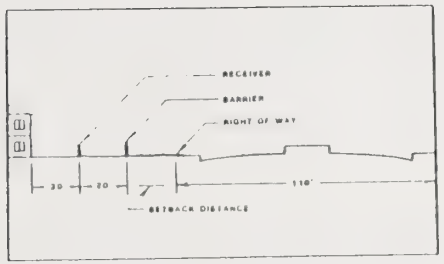
Table 3c. Noise Level Reductions (NLR) Required to Mitigate Traffic Noise Impact at Second Floor Elevations Protected by a Barrier, Major Arterial (1979), No Setback, 3.5% Truck Mix*

	Lot Configuration	Projected Average Daily Traffic (ADT)											
		5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
	10' Above Grade	20	20	20	20	20	20	20	20	20	20	20	20
	8' Above Grade	20	20	20	20	20	20	20	20	20	20	20	20
	6' Above Grade	20	20	20	20	20	20	20	20	20	25	25	25
	4' Above Grade	20	20	20	20	20	20	25	25	25	25	25	25
	2' Above Grade	20	20	20	20	25	25	25	25	25	25	25	25
	At Grade	20	20	20	25	25	25	25	25	25	25	25	25
	2' Below Grade	20	20	20	25	25	25	25	25	25	25	25	25
	4' Below Grade	20	20	20	25	25	25	25	25	25	25	25	25
	6' Below Grade	20	20	20	20	20	25	25	25	25	25	25	25
	8' Below Grade	20	20	20	20	20	20	25	25	25	25	25	25
	10' Below Grade	20	20	20	20	20	20	20	25	25	25	25	25

* First floor elevations protected by a barrier require a minimum NLR of 20.
First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

Table 3d. Noise Level Reductions (NLR) Required to Mitigate Traffic Noise Impact at Second Floor Elevations Protected by a Barrier, Major Arterial (1979), Residence at Grade of Arterial, Various Setbacks, 3.5% Truck Mix*



Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
At Grade, 0' Setback	20	20	20	25	25	25	25	25	25	25	25	25
At Grade, 10' Setback	20	20	20	25	25	25	25	25	25	25	25	25
At Grade, 20' Setback	20	20	20	25	25	25	25	25	25	25	25	25
At Grade, 40' Setback	20	20	20	25	25	25	25	25	25	25	25	25
At Grade, 80' Setback	20	20	20	20	25	25	25	25	25	25	25	25
At Grade, 160' Setback	20	20	20	20	20	20	25	25	25	25	25	25

* First floor elevations protected by a barrier require a minimum NLR of 20.
First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

NOTE: "Setback distance" is the distance from the arterial right-of-way to the barrier.

TABLE 3E
NLR

Table 3e. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Route 99, At Grade *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)													
	35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
9%	25	25	25	25	25	25	25	25	25	25	30	30	30	30
12%	25	25	25	25	25	25	25	25	30	30	30	30	30	30
15%	25	25	25	25	25	30	30	30	30	30	30	30	30	30
18%	25	25	25	30	30	30	30	30	30	30	30	25	30	25
21%	25	25	30	30	30	30	30	30	30	25	25	25	25	25
24%	25	25	30	30	30	30	30	30	30	25	25	25	N/A	N/A

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 3F
NLR

Table 3f. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 99, Fwy. Elevated 4'*

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)													
	35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	25	25	25	25	25	25	25	25	25	25	25	25	25	30
9%	25	25	25	25	25	25	25	25	25	25	30	30	30	30
12%	25	25	25	25	25	25	25	30	30	30	30	30	30	30
15%	25	25	25	25	25	30	30	30	30	30	30	30	30	30
18%	25	25	25	30	30	30	30	30	30	30	30	30	30	30
21%	25	25	30	30	30	30	30	30	30	30	30	30	30	25
24%	25	30	30	30	30	30	30	30	30	30	30	25	N/A	N/A

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

Table 3g. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 99, Fwy. Depressed 4' *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)													
	35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
9%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
12%	25	25	25	25	25	25	25	25	25	30	25	25	30	25
15%	25	25	25	25	25	25	25	25	25	30	25	25	25	25
18%	25	25	25	25	25	25	25	30	30	25	25	25	25	25
21%	25	25	25	30	30	30	30	25	25	25	25	25	25	25
24%	25	25	30	30	30	25	25	25	25	25	25	25	N/A	N/A

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 3H
NLR

Table 3h. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Union Avenue *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 14500	16500	18500	20500	22500	24500	26500	28500	30500
4%	25	25	25	25	25	25	25	25	25
5%	25	25	25	25	25	25	25	25	25
6%	25	25	25	25	25	25	25	25	25
7%	25	25	25	25	25	25	25	25	25
8%	25	25	25	25	25	25	25	25	25
9%	25	25	25	25	25	25	25	25	25
10%	25	25	25	25	25	25	25	25	25

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

Table 31. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 178 East of Fairfax, At Grade *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	20	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
7%	20	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
9%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
11%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
13%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
15%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 3J
NLR

Table 3j. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 178 East of Fairfax, Fwy. Elevated 20' *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	20	25	25	25	25	25	25	25	25	25	30	30	30	30	30	30
7%	25	25	25	25	25	25	25	25	30	30	30	30	30	30	30	30
9%	25	25	25	25	25	25	30	30	30	30	30	30	30	30	30	30
11%	25	25	25	25	25	30	30	30	30	30	30	30	30	30	30	30
13%	25	25	25	25	30	30	30	30	30	30	30	30	30	30	30	30
15%	25	25	25	30	30	30	30	30	30	30	30	30	30	30	30	30

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 3K
NLR

Table 3k. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 178 East of Fairfax, Fwy. Depressed 20'*

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)															
	7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
7%	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
9%	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	25
11%	20	20	20	20	20	20	20	20	20	20	20	20	25	25	25	25
13%	20	20	20	20	20	20	20	20	20	20	20	25	25	25	25	25
15%	20	20	20	20	20	20	20	20	20	25	25	25	25	25	25	25

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 3L
NLR

Table 31. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 178 East of Rt. 184, At Grade *

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	20	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
7%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
9%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
11%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
13%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
15%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 3M
NLR

Table 3m. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 178 East of Rt. 184, Fwy. Elevated 10'*

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	25	25	25	25	25	25	25	25	25	25	25	25	25	30	25	25
7%	25	25	25	25	25	25	25	25	25	25	30	25	30	25	25	25
9%	25	25	25	25	25	25	25	25	25	30	25	25	25	25	25	25
11%	25	25	25	25	25	25	30	30	25	25	25	25	25	25	25	25
13%	25	25	25	25	25	25	30	25	25	25	25	25	25	25	30	30
15%	25	25	25	25	25	25	25	25	25	25	25	25	30	30	30	30

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 3N
NLR

Table 3n. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 178 East of Rt. 184, Fwy. Depressed 10'*

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
7%	20	20	20	20	20	20	20	20	20	20	20	20	20	25	25	25
9%	20	20	20	20	20	20	20	20	20	20	25	25	25	25	25	25
11%	20	20	20	20	20	20	20	20	25	25	25	25	25	25	25	25
13%	20	20	20	20	20	20	20	25	25	25	25	25	25	25	25	25
15%	20	20	20	20	20	20	25	25	25	25	25	25	25	25	25	25

*First floor elevations protected by a barrier require a minimum NLR of 20.

First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

TABLE 30
NLR

Table 30. Noise Level Reduction (NLR) Required at 2nd Floor to Mitigate Impact, Rt. 184, At Grade *

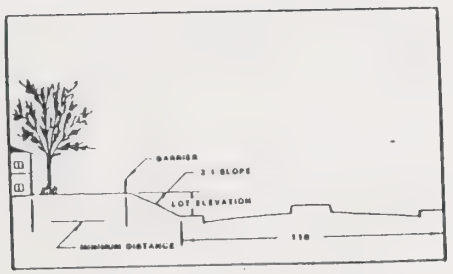
TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)										
	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000	17000
7%	25	25	25	25	25	25	25	25	25	25	25
9%	25	25	25	25	25	25	25	25	25	25	25
11%	25	25	25	25	25	25	25	25	25	25	25
13%	25	25	25	25	25	25	25	25	25	25	25
15%	25	25	25	25	25	25	25	25	25	25	25
17%	25	25	25	25	25	25	25	25	25	25	25
19%	25	25	25	25	25	25	25	25	25	25	25

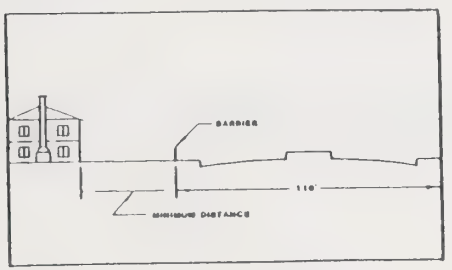
*First floor elevations protected by a barrier require a minimum NLR of 20.

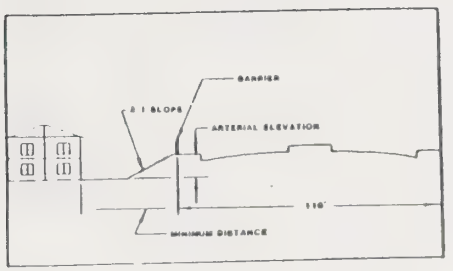
First and second floor elevations not protected by a barrier require a minimum NLR as follows:

CNEL Range	NLR
60-65 dB	20
66-70	25
71-75	30

Table 4a. Minimum Distances From Recommended Noise Barriers Beyond Which Second Floor Elevations Do Not Require Noise Control Measures, Major Arterial (1979), No Setback, 7% Truck Mix



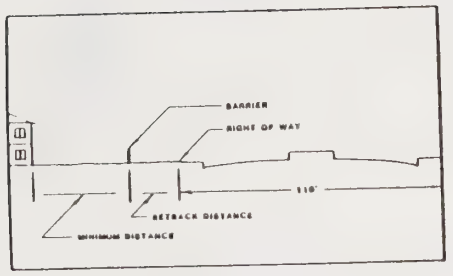




Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
10' Above Grade	25'	35'	45'	55'	75'	90'	105'	115'	130'	140'	155'	165'
8' Above Grade	25'	40'	55'	65'	85'	95'	115'	130'	145'	160'	175'	190'
6' Above Grade	35'	45'	60'	70'	90'	110'	130'	150'	170'	185'	200'	210'
4' Above Grade	35'	55'	80'	105'	130'	155'	180'	200'	215'	240'	250'	260'
2' Above Grade	50'	90'	120'	150'	190'	200'	230'	255'	275'	290'	310'	330'
At Grade	75'	140'	195'	205'	220'	250'	280'	310'	350'	365'	375'	390'
2' Below Grade	70'	120'	180'	235'	240'	275'	310'	340'	370'	395'	420'	460'
4' Below Grade	55'	105'	165'	220'	275'	330'	330'	365'	400'	440'	470'	500'
6' Below Grade	55'	90'	150'	205'	265'	320'	375'	430'	455'	480'	505'	530'
8' Below Grade	50'	80'	135'	190'	250'	310'	365'	420'	475'	530'	550'	570'
10' Below Grade	45'	65'	125'	180'	235'	290'	345'	400'	460'	520'	575'	630'

TABLE 4B
MIN. DISTANCE

Table 4b. Minimum Distances From Recommended Noise Barriers Beyond Which Second Floor Elevations Do Not Require Noise Control Measures, Major Arterial (1979), Residence at Grade of Arterial, Various Setbacks, 7% Truck Mix

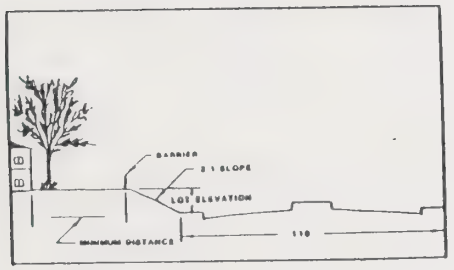


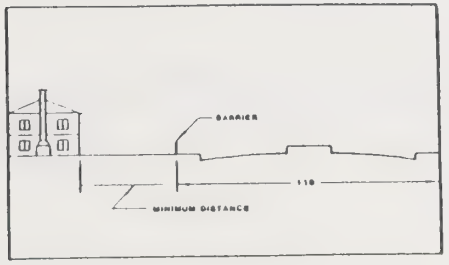
Lot Configuration	Projected Average Daily Traffic (ADT) 5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
At Grade, 0' Setback	75'	140'	195'	205'	220'	250'	280'	310'	350'	365'	375'	390'
At Grade, 10' Setback	70'	135'	190'	245'	255'	275'	310'	345'	375'	400'	420'	440'
At Grade, 20' Setback	65'	130'	185'	240'	260'	295'	330'	365'	400'	430'	460'	480'
At Grade, 40' Setback	60'	120'	175'	230'	285'	310'	345'	380'	420'	460'	510'	540'
At Grade, 80' Setback	50'	100'	150'	205'	260'	320'	380'	420'	460'	500'	540'	580'
At Grade, 160' Setback	10'	70'	130'	170'	210'	265'	320'	380'	440'	510'	580'	620'

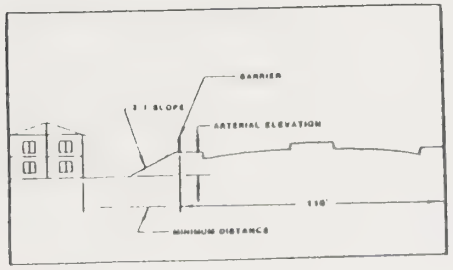
NOTE: "Setback distance" is the distance from the arterial right-of-way to the barrier.

TABLE 4C
MIN. DISTANCE

Table 4c. Minimum Distances From Recommended Noise Barriers Beyond Which Second Floor Elevations Do Not Require Noise Control Measures, Major Arterial (1979), No Setback, 3.5% Truck Mix



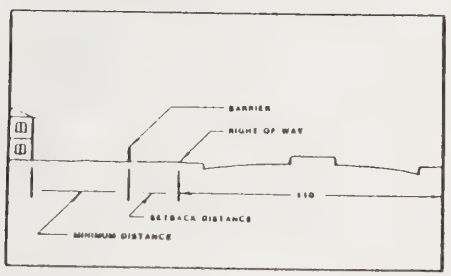




Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
10' Above Grade	20'	25'	30'	40'	45'	55'	65'	75'	80'	90'	100'	105'
8' Above Grade	20'	30'	40'	50'	55'	65'	70'	80'	90'	100'	110'	120'
6' Above Grade	25'	35'	40'	50'	60'	70'	80'	90'	100'	110'	120'	135'
4' Above Grade	25'	40'	55'	70'	80'	95'	110'	125'	140'	155'	170'	185'
2' Above Grade	30'	60'	80'	100'	120'	140'	165'	185'	195'	205'	215'	225'
At Grade	40'	85'	130'	160'	190'	190'	205'	215'	230'	245'	270'	285'
2' Below Grade	35'	75'	115'	150'	180'	215'	250'	260'	265'	280'	290'	320'
4' Below Grade	35'	65'	100'	130'	165'	200'	235'	270'	305'	340'	345'	350'
6' Below Grade	35'	50'	80'	115'	150'	185'	220'	255'	290'	325'	360'	390'
8' Below Grade	35'	40'	70'	105'	140'	175'	205'	240'	275'	310'	345'	380'
10' Below Grade	35'	35'	60'	95'	125'	160'	195'	230'	260'	295'	330'	370'

TABLE 4D
MINI. DISTANCE

Table 4d. Minimum Distances From Recommended Noise Barriers Beyond Which Second Floor Elevations Do Not Require Noise Control Measures, Major Arterial (1979), Residence at Grade of Arterial, Various Setbacks, 3.5% Truck Mix



Lot Configuration	Projected Average Daily Traffic (ADT)											
	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000	55000	60000
At Grade, 0' Setback	40'	85'	130'	160'	190'	190'	205'	215'	230'	245'	270'	285'
At Grade, 10' Setback	40'	90'	125'	160'	195'	230'	230'	245'	255'	270'	285'	310'
At Grade, 20' Setback	40'	80'	120'	155'	190'	230'	265'	265'	280'	290'	320'	340'
At Grade, 40' Setback	35'	70'	110'	150'	185'	220'	260'	295'	315'	330'	350'	365'
At Grade, 80' Setback	15'	55'	95'	130'	160'	200'	235'	275'	310'	350'	390'	420'
At Grade, 160' Setback	10'	50'	80'	105'	135'	160'	190'	220'	260'	300'	340'	380'

NOTE: "Setback distance" is the distance from the arterial right-of-way to the barrier.

TABLE 4E
MIN. DISTANCE

Table 4e. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 99, At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	100'	100'	110'	120'	130'	130'	140'	150'	160'	170'	170'	180'	180'	200'
9%	110'	120'	130'	140'	160'	170'	180'	180'	200'	200'	210'	210'	210'	230'
12%	130'	140'	160'	180'	190'	200'	200'	210'	230'	230'	230'	240'	240'	240'
15%	150'	170'	180'	200'	210'	220'	220'	240'	240'	240'	240'	240'	260'	260'
18%	170'	190'	210'	220'	230'	240'	250'	250'	250'	250'	250'	250'	260'	260'
21%	190'	210'	220'	230'	240'	240'	250'	250'	250'	250'	250'	270'	270'	270'
24%	210'	220'	230'	250'	250'	260'	260'	270'	270'	270'	270'	270'	N/A	N/A

TABLE 4F
MIN. DISTANCE

Table 4f. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 99, Fwy. Elevated 4'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	90'	100'	120'	140'	150'	160'	170'	180'	190'	200'	200'	220'	220'	240'
9%	120'	140'	170'	180'	190'	190'	200'	220'	230'	240'	260'	270'	290'	290'
12%	160'	170'	190'	200'	220'	230'	250'	270'	280'	290'	310'	320'	320'	340'
15%	170'	190'	210'	230'	250'	280'	300'	310'	320'	330'	330'	350'	350'	350'
18%	190'	220'	250'	270'	290'	310'	330'	340'	340'	350'	350'	370'	370'	370'
21%	220'	250'	280'	310'	310'	330'	340'	350'	350'	380'	380'	380'	380'	380'
24%	250'	280'	300'	320'	340'	360'	370'	370'	380'	380'	380'	380'	N/A	N/A

TABLE 4G
MIN. DISTANCE

Table 4g. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 99, Fwy. Depressed 4'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)													
	35000	40000	45000	50000	55000	60000	65000	70000	75000	80000	85000	90000	95000	100000
6%	80'	90'	90'	100'	100'	120'	120'	120'	130'	130'	140'	140'	150'	150'
9%	90'	100'	110'	120'	130'	140'	150'	150'	150'	160'	160'	170'	170'	170'
12%	110'	120'	130'	140'	140'	160'	160'	160'	160'	170'	170'	170'	180'	180'
15%	130'	140'	150'	160'	160'	170'	170'	170'	170'	180'	180'	180'	180'	190'
18%	150'	150'	160'	160'	170'	170'	170'	190'	190'	190'	190'	190'	190'	190'
21%	150'	160'	170'	180'	180'	180'	190'	190'	190'	190'	190'	190'	190'	190'
24%	160'	170'	180'	180'	190'	190'	190'	190'	190'	190'	190'	190'	N/A	N/A

TABLE 4H
MIN. DISTANCE

Table 4h. Distance From Barrier At Which Noise Control Isn't Needed, Union Avenue

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)								
	14500	16500	18500	20500	22500	24500	26500	28500	30500
4%	50'	60'	70'	80'	80'	80'	80'	80'	80'
5%	70'	80'	90'	90'	90'	90'	90'	90'	90'
6%	80'	90'	90'	90'	90'	90'	90'	90'	90'
7%	90'	90'	90'	90'	90'	90'	90'	90'	90'
8%	90'	90'	90'	90'	90'	90'	90'	90'	100'
9%	80'	80'	80'	80'	80'	90'	90'	90'	100'
10%	80'	80'	80'	80'	90'	90'	100'	100'	110'

TABLE 4I
MIN. DISTANCE

Table 4i. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 178 East of Fairfax, At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	30'	50'	50'	60'	70'	80'	90'	100'	100'	100'	110'	110'	110'	120'	120'	120'
7%	40'	50'	60'	80'	90'	100'	110'	110'	110'	110'	110'	120'	130'	130'	140'	140'
9%	50'	60'	80'	100'	110'	110'	110'	110'	120'	120'	130'	130'	150'	150'	160'	170'
11%	60'	80'	90'	110'	110'	110'	110'	110'	130'	130'	150'	150'	160'	170'	180'	190'
13%	70'	90'	110'	110'	110'	110'	120'	130'	140'	150'	160'	170'	180'	200'	200'	220'
15%	80'	100'	110'	110'	110'	120'	130'	140'	150'	170'	180'	190'	200'	220'	220'	240'

TABLE 4J
MIN. DISTANCE

Table 4j. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 178, East of Fairfax, Freeway Elevated 20'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	40'	70'	110'	140'	170'	210'	240'	270'	300'	330'	370'	390'	420'	450'	480'	510'
7%	60'	100'	140'	190'	230'	260'	300'	340'	370'	410'	450'	480'	520'	540'	580'	600'
9%	80'	130'	180'	230'	270'	320'	360'	400'	450'	480'	520'	570'	590'	640'	660'	700'
11%	110'	160'	220'	270'	320'	370'	420'	460'	520'	560'	600'	650'	680'	700'	750'	750'
13%	130'	190'	260'	310'	370'	420'	480'	530'	570'	630'	670'	730'	760'	770'	830'	850'
15%	160'	230'	290'	350'	410'	470'	530'	580'	650'	700'	740'	800'	820'	860'	920'	940'

TABLE 4K
MIN. DISTANCE

Table 4k. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 178 East of Fairfax, Fwy. Depressed 20'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)															
	7000	9000	11000	13000	15000	17000	19000	21000	23000	25000	27000	29000	31000	33000	35000	37000
5%	20'	20'	20'	20'	20'	30'	30'	30'	30'	30'	30'	30'	30'	30'	30'	30'
7%	20'	20'	20'	30'	30'	30'	30'	30'	30'	30'	30'	30'	30'	40'	40'	40'
9%	20'	20'	30'	30'	30'	30'	30'	30'	30'	30'	30'	40'	40'	40'	40'	50'
11%	20'	30'	30'	30'	30'	30'	30'	30'	30'	40'	40'	40'	50'	50'	50'	50'
13%	20'	30'	30'	30'	30'	30'	30'	30'	40'	40'	40'	50'	50'	60'	60'	60'
15%	30'	30'	30'	30'	30'	30'	30'	40'	40'	50'	50'	50'	60'	60'	60'	70'

TABLE 4L
MIN. DISTANCE

Table 4l. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 178 East of Rt. 184, At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)															
	8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	40'	50'	60'	80'	90'	90'	90'	90'	90'	90'	90'	90'	90'	90'	100'	100'
7%	50'	70'	80'	90'	90'	90'	90'	90'	90'	90'	90'	90'	100'	100'	110'	110'
9%	70'	80'	80'	80'	80'	80'	80'	90'	100'	100'	110'	110'	110'	120'	120'	130'
11%	80'	90'	90'	90'	90'	90'	90'	100'	110'	110'	120'	130'	130'	130'	130'	130'
13%	90'	90'	90'	90'	90'	100'	100'	110'	120'	130'	130'	130'	140'	140'	140'	140'
15%	80'	80'	80'	90'	100'	110'	110'	120'	120'	130'	130'	130'	140'	140'	140'	140'

TABLE 4M
MIN. DISTANCE

Table 4m. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 178 East of Rt. 184, Fwy. Elevated 10'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	80'	100'	120'	120'	120'	130'	140'	150'	170'	180'	190'	210'	210'	230'	230'	240'
7%	100'	110'	120'	130'	140'	160'	180'	200'	210'	220'	240'	250'	270'	270'	270'	270'
9%	120'	130'	130'	160'	180'	200'	220'	230'	240'	260'	260'	270'	270'	270'	270'	270'
11%	130'	130'	160'	180'	200'	220'	250'	260'	260'	260'	260'	260'	260'	260'	260'	260'
13%	140'	150'	180'	200'	230'	240'	280'	280'	280'	280'	280'	280'	280'	280'	280'	280'
15%	140'	170'	200'	230'	250'	250'	280'	280'	280'	280'	280'	280'	280'	280'	280'	280'

TABLE 4N
MIN. DISTANCE

Table 4n. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 178 East of Rt. 184, Fwy. Depressed 10'

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT) 8000	10000	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000	32000	34000	36000	38000
5%	20'	20'	30'	30'	30'	30'	30'	30'	30'	30'	30'	40'	40'	40'	40'	40'
7%	20'	30'	30'	30'	30'	30'	30'	30'	40'	40'	40'	40'	40'	50'	50'	50'
9%	30'	30'	30'	30'	30'	30'	40'	40'	40'	40'	50'	50'	50'	50'	60'	60'
11%	30'	30'	30'	30'	30'	40'	40'	40'	50'	50'	50'	60'	60'	60'	70'	70'
13%	30'	30'	30'	30'	40'	40'	40'	50'	50'	60'	60'	60'	70'	70'	70'	70'
15%	30'	30'	30'	40'	40'	40'	50'	50'	60'	60'	70'	70'	70'	70'	70'	70'

TABLE 40
MIN. DISTANCE

Table 40. Distance From Barrier At Which Noise Control Isn't Needed, Rt. 184, At Grade

TRUCK MIX	AVERAGE DAILY TRAFFIC (ADT)										
	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000	17000
7%	60'	70'	80'	80'	80'	80'	80'	80'	80'	80'	80'
9%	70'	80'	80'	80'	80'	80'	80'	80'	80'	80'	80'
11%	80'	80'	80'	80'	80'	80'	80'	80'	80'	80'	80'
13%	70'	70'	70'	70'	70'	70'	80'	80'	90'	90'	90'
15%	60'	60'	60'	70'	70'	80'	80'	90'	90'	90'	100'
17%	60'	60'	70'	70'	80'	90'	90'	90'	100'	100'	100'
19%	70'	70'	70'	80'	80'	90'	90'	100'	100'	100'	100'

TABLE 5A
CONST. DETAILS.

Table 5a. Construction Details to Achieve a Noise Level Reduction (NLR) of 20 dB

Assembly	Construction Details
Ventilation	Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use. A forced air circulation system shall be provided which will give a minimum of two complete air changes per hour, of which at least 1/5 is fresh air per requirements of the Mechanical Code.
Glazing and Doors	All windows and sliding glass doors shall be tightly fitted assemblies, and all entry doors from exterior spaces shall be well weather-stripped. Air gaps and rattling shall not be permitted.

NRL: 25 dB

Table 5b. Construction Details to Achieve a Noise Level Reduction (NLR) of 25 dB

Assembly	Construction Details
Exterior Walls	If wood construction is used, exterior walls shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer. The interior surface shall be at least 1/2" gypsum board. Insulation having a minimum value of R-11 shall be placed between the studs. Masonry walls, if used, shall have at least one surface of the wall plastered, painted, or covered with gypsum wall board or approved material. There shall be no direct openings (such as mail slots or ventilation units) on an elevation facing the arterial.
Glazing	All windows and sliding glass doors facing the noise source shall be well fitted, well weatherstripped assemblies and shall have a minimum STC of 28. Windows and sliding glass doors on side elevations which do not have a line-of-sight to the noise source shall have a minimum STC of 24. Air gaps and rattling shall not be permitted.
Doors	All exterior doors facing the arterial shall be well weatherstripped solid core assemblies at least 1-3/4" thick.
Roof	Roof sheathing of wood construction shall be well fitted or caulked plywood at least 1/2" thick. The roof deck of masonry construction shall have a surface density of at least 7 lbs/sq. ft. and shall contain a solid core at least 1/2" thick.
Roof (contd.)	Insulation with at least a rating of R-19 shall be used in the attic space or between the roof rafters.
Ventilation	Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use. A forced air circulation system shall be provided which will give a minimum of two complete air changes per hour, of which at least 1/5 is fresh air per requirements of the Mechanical Code. Any air duct or connection to an outdoor elevation facing the noise source must contain an interior sound absorbent lining which is at least acoustically equivalent to 1" thick fiberglas duct liner. The liner shall be greater in length than 5 times the diameter of the duct. All such ducts shall contain a bend which eliminates the line-of-sight to the outside. All fireplaces shall be provided with a well fitted damper.
Furnishings	All rooms, when in use, are expected to contain furniture or other materials that absorb sound equivalent to the absorption provided by wall-to-wall carpeting over a conventional pad.

NRL: 30 dB

Table 5c. Construction Details to Achieve a Noise Level Reduction (NLR) of 30 dB

Assembly	Construction Details
Exterior Walls	If wood construction is used, exterior walls shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer. The interior surface shall be at least 1/2" gypsum board. Insulation having a minimum value of R-11 shall be placed between the studs. Masonry walls, if used, shall have at least one surface of the wall plastered, painted, or covered with gypsum wall board or approved material. There shall be no direct openings (such as mail slots or ventilation units) on an elevation facing the arterial.
Glazing	All windows and sliding glass doors facing the noise source shall be well fitted, well weatherstripped assemblies and shall have a minimum STC of 34. Windows and sliding glass doors on side elevations which do not have a line-of-sight to the noise source shall have a minimum STC of 30. Air gaps and rattling shall not be permitted.
Doors	All exterior doors facing the arterial shall be well weatherstripped solid core assemblies at least 1-3/4" thick.
Roof	Roof sheathing of wood construction shall be well fitted or caulked plywood at least 1/2" thick. The roof deck of masonry construction shall have a surface density of at least 7 lbs/sq. ft. and shall contain a solid core at least 1/2" thick. Insulation with at least a rating of R-19 shall be used in the attic space.
Floor	The floor of the lowest occupied room shall be a concrete slab or shall be well sealed against the noise intrusion.
Ventilation	Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use. A forced air circulation system shall be provided which will give a minimum of two complete air changes per hour, of which at least 1/5 is fresh air per requirements of the Mechanical Code. Any air duct or connection to an outdoor elevation facing the noise source must contain an interior sound absorbent lining which is at least acoustically equivalent to 1" thick fiberglas duct liner. The liner shall be greater in length than 5 times the diameter of the duct. All such ducts shall contain a bend which eliminates the line-of-sight to the outside. All fireplaces shall be provided with a well fitted damper.
Furnishings	All rooms, when in use, are expected to contain furniture or other materials that absorb sound equivalent to the absorption provided by wall-to-wall carpeting over a conventional pad.

APPENDIX VII

Environmental Assessment for the Noise Element of the General Plan, City of Bakersfield

Environmental Assessment for the Noise Element of the General Plan - City of Bakersfield

A. Project Description

The Noise Element, as part of the comprehensive General Plan of the City of Bakersfield, encompasses all land and land uses within the limits of the city. The boundaries of the city are shown on the map of the Land Use Element.

The Noise Element is a statement of the city's policy and intent regarding land use in relation to environmental noise and the control of noise sources within the community. It's purpose is to provide a framework within which future planning and noise reducing decisions will be made and implemented. It is intended to represent the consensus of the community's goals and objectives pertaining to the control of environmental noise.

Specific objectives of the Plan include:

- Prevention of further deterioration of the noise environment in existing situations,
- Prevention of the intrusion of noise from new sources into residential zones,
- Application of noise mitigating measures in site development, orientation, and building construction.

Methodology for achievement of the Plan objectives is through adoption of:

- Land use sensitivity classifications
- Land use noise standards
- Improved zoning, building, and noise ordinances
- A correlated set of implementational guidelines to be applied at the general and specific Plan levels

B. Environmental Setting

The specific setting, as it relates to noise, is typical of the surrounding contiguous communities within Kern County. From a noise standpoint, the environmental setting is good because of the minimal noise impact at most residential areas within the city. However, some portions of the city are significantly impacted by freeway, highway, and major arterial traffic, as well as by railway and airport operations.

C. Environmental Condition

Noise is experienced, to some extent, throughout the City of Bakersfield. The levels of noise are most significant in proximity to the freeways, major arterials, railroads, and airports.

D. Assessment of Impact

The direct environmental impact of the proposed action is the progressive improvement of the noise environment, resulting in improved quality of life. The major, indirect impact is added regulation in new uses of land, site development and building construction. The added regulation will increase development and

building costs in some instances. These added costs are not greater, however, than that currently being incurred by the more knowledgeable and far-sighted developers. The regulations are mandated by State law and impose minimum standards with consideration given to both quality of life and economic considerations.

The short-term impact of the regulation of land use and minimal added cost will be far outweighed by long-term benefits of quality of life and economic productivity.

E. Adverse Environmental Effects Which Cannot Be Avoided if the Proposal is Implemented

The proposed Noise Element does not have any adverse environmental impact. (Regulation of the use of land resources, for environmental improvement, is not considered to be an adverse impact.)

F. Reduction Measures Proposed to Minimize the Impact

The Noise Element would have unacceptable economic impact if its proposed requirements are made retroactive.

Provisions are included for situations where application of the proposed requirements would cause undue hardship not commensurate with the intended benefits of the Noise Element or not consistent with justice to the individual.

G. Alternatives to the Proposed Action

1. No Project. A "no project" alternative would result in progressive deterioration of the city's noise environment, ineligibility for State aid for noise mitigating measures, and non-compliance with the State's mandate.

2. More Stringent Noise Standards. The exterior noise standard of 65 dB CNEL for residential and other noise-sensitive land uses is 10 dB higher than that identified by the EPA as "requisite to protect public health and welfare with an adequate margin of safety". The EPA cautions that the criteria "do not take into account cost or feasibility", and that "States and localities will approach this information according to individual needs and situations".

   After establishing the present noise contours for the City of Bakersfield, existing land uses were examined in relation to the CNEL of 55 dB. The city is impacted by levels greater than a CNEL of 55 dB. These impacts are dominated by freeway and traffic noise. The attainment of substantially lower ambient levels is not a realistic goal, and, accordingly, a CNEL standard of 55 dB would be of little value in land use planning. Instead, land use planning in relation to noise should be directed along practical lines of controlling the placement of sensitive uses and incorporating noise mitigating strategy in new developments.

3. Less Stringent Noise Standards. As environmental noise levels increase above a CNEL of 65 dB, most people will find the environment objectionable for outdoor living and relaxation uses; in fact, as identified by the EPA, the idealized

goal is a CNEL of 55 dB. The interior level should not be greater than a CNEL of 45 dB in consideration of minimum requirements for speech intelligibility, television listening, and sleep. Since conventional residential construction provides 20 dB of noise attenuation (with windows closed), the standard is marginally met with an exterior CNEL of 65 dB. Hence, a less stringent noise standard would be inconsistent with the objectives of the Plan.

H. Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

Short-term: There will be some instances where the owner of a piece of property will not be able to develop his land as planned or will be subject to new regulations which may add to his costs.

Long-term: The value of present land resources will be enhanced under regulated use and new property developments will be more desirable, productive, and valuable. Quality of life will be improved and substandard housing situations will be avoided.

I. Irreversible Environmental Changes Which Would Be Involved in the Proposed Action - Should It Be Implemented

There are no irreversible environmental changes involved.

J. Growth-Inducing Impact of the Proposed Action

The implementation of meaningful, effective, and equitable regulations directed at assuring planned compatibility of residential and industrial land uses with the noise environment will encourage commitment of funds in both these areas by development investors. The Noise Element, therefore, will have a favorable growth-inducing impact.

K. Organizations and Persons Consulted

This environmental assessment was prepared by J. J. Van Houten & Associates, Inc., Anaheim, California, under contract with the City of Bakersfield. Noise criteria developed by the Kern County and State of California Departments of Health, the State Department of Transportation, the Environmental Protection Agency, and by the U.S. Department of Housing and Urban Development have been employed in the development of the Noise Element and its environmental assessment. In addition, research projects reported by the Federal Highway Administration were instrumental in the development of the noise contours and related land use recommendations.

The Bakersfield Chamber of Commerce and the Building Industry Association contributed to the preparation of the Noise Element by providing review and comment.

APPENDIX VIII

Consistency With the General Plan

Consistency With the General Plan

The Noise Element is one of seven elements required for inclusion in the General Plan.

The General Plan of the City of Bakersfield consists of the following eleven elements: Land Use, Circulation, Housing, Conservation, Open Space, Noise, Seismic Safety, Scenic Highways, Safety and Public Services and Facilities Element and Kern River Plan. The latter two are optional elements.

State Legislation requires that these elements be consistent in supporting the goals and objectives of the plan. The purpose of this section is to compare the Noise Element policies with the policies stated in other elements of the General Plan for consistency and compatibility. Although all elements of the General Plan could conceivably affect the policies and programs identified in the Noise Element, the Land Use, Circulation, Open Space and Conservation elements contain policies which have a more direct bearing on implementation.

The following is a list of existing policies from General Plan elements which relate to the Noise Element. Following each policy statement is a brief discussion of its relevance to the Noise Element and a list of Noise Element policies which pertain to it. At the end of the section is a general discussion of the practical application of Noise Element policy and its potential for impact on the Land Use element of the General Plan.

Land Use Element Policies

1. The quality of existing residential neighborhoods should be preserved and enhanced.

   Relation: The quality of existing residential neighborhoods is affected by the amount of noise experienced by residents. Improvement or preservation of the existing noise environment may result from implementation of policies designed to reduce or control present (1983) or future (Year 2000) noise impacts.

   Noise Element policies 2, 3, 4, 5, 6, 7, 10, 11, 12 and 14 relate to this issue.

2. Provide for appropriate zoning and covenants to protect the land from conflicting and blighting land uses.

   Relation: Zoning (and general designations) and covenants (including CEQA mitigation measures on projects) which consider noise impacts are tools which may be used to enhance living environments in existing and future residential neighborhoods.

   Noise Element policies 1, 7, 8, 9, 10, 12, 13 and 15 relate to this issue.

3. Residential areas should be based on a pattern of orderly development to create safe and attractive neighborhoods with conveniently located schools, parks, and local shopping facilities.

Relation: Attention to undesirable noise emissions or impacts during the planning stages of neighborhoods will assist in the creation of attractive neighborhoods.

Noise Element policies 1, 7, 8, 9, 10, 12, and 13 relate to this issue.

4. Medium and high density residential uses should be in areas where higher density use will provide for more efficient utilization of land and permit retention of open space areas and/or areas exhibiting physical constraints.

Relation: Figure 3 displays CNEL tolerances for multiple family dwelling units. Vacant multiple family zones exposed to noise above 65 dB may be more efficiently utilized if preserved as open space when other mitigation cannot be employed to reduce noise to acceptable levels. Open space may be used as a buffer between major noise sources and multiple family development. Resulting open space may also satisfy the need for recreation and drainage associated with nearby residential development, or provide for neighborhood gardens or agricultural farming.

Noise Element policy 12 relates to this issue.

5. Multiple family residential development may serve as a buffer between higher intensity uses, such as commercial, or between major thoroughfares and single family residential development.

Relation: Multiple family residential development may sometimes serve as an acceptable buffer between major noise sources and single family residential development. Multiples can be used as an alternative to more costly mitigation; however, other planning criteria must also be satisfied.

Noise Element policies 1, 8, 9, 12, and 13 relate to this issue.

6. Medium to high density residential (use) is to be permitted as a buffer between single family residential and major roads or highways.

Relation: See response to Land Use Element Policy Number 5. Same Noise Element policies apply.

7. The construction of streets and highways should be coordinated with the development of neighborhoods to promote efficient and adequate circulation without cutting through the neighborhood.

Relation: The Noise Element provides standards through which noise produced or predicted along streets which cut through neighborhoods can be evaluated to assure that unacceptable impacts do not occur.

Noise Element policy Number 1 relates to this issue.

CIRCULATION ELEMENT POLICIES

8. Major streets should be so located as to bound - rather than cut through - residential neighborhoods. Residential streets should be reserved for local residential traffic.

   Relation: See response to Land Use element Policy Number 7. The same Noise Element policy applies.

9. The City and County should work closely with the State Division of Highways so that freeways are depressed wherever possible and are landscaped. Interchanges should be located so as to connect with primary arterials of the community's major street system.

   Relation: Depression of freeways can serve as noise mitigation as evidenced by comparison of noise contours along depressed portions of Freeway 99 and Highway 178 with ground level portions of the same roadways on maps accompanying this document. Landscaping will not attenuate noise although it may serve more appropriately to mitigate visual impacts.

   Noise Element Policy Number 2 relates to this issue.

OPEN SPACE ELEMENT POLICIES

10. Incorporate drainage sumps as an integral part of a park, where practical, using it as a multi-purpose sump and game area, thereby creating larger open spaces for the same amount spent, and at the same time creating a better visual environment than if the sump were to stand alone.

Relation: In areas where noise impacts are severe enough that open space is considered the best use of the property, utilization of the site as a drainage or recreation area may also be feasible.

Noise Element Policy 12 addresses this issue.

11. Mandatory regulatory measures to protect the environment and surrounding land uses from possible pollution by noise, dust, smoke and water contamination should be instituted.

Relation: The Noise Element includes policy and standards conducive to compliance with State standards regarding noise exposure. These policies and standards are targeted toward enhancement of the living environment for Bakersfield residents.

All policies in the Noise Element address this issue.

As indicated in Table 1 and Table 2, a significant existing and projected population is or will be affected by undesirable noise levels under existing and future development and zoning. The Year 2000 Noise contour Map displays noise impacts of 65 dB or greater adjacent to every major arterial, highway and freeway within the City. It should be noted, however, that noise contours do not account for masonry walls and sound walls or the barrier-like effect of buildings currently in existence.

Although the projected Year 2000 increase in the number of residents impacted is primarily due to an increase in traffic volumes, a consideration for vacant property shown as residential on the Land Use element which is subject to unacceptable noise levels (see Figure 3) would reduce the projected total number of persons impacted. Areas of main concern include Highway 178, between the intersection with Highway 184 and Alfred Harrell Highway, and Freeway 99, between Panama Lane and Pacheco Road. These portions of at-grade roadway are subject to noise levels in excess of 75 dB(A) as a result of projected high traffic volumes. Additional areas adjacent to these routes and other majors are depicted as residential on the Land Use element and are exposed to CNEL noise levels in excess of 60 dB. Although in some locations it may be desirable to amend the Land Use element from residential to more compatible designations such as commercial, industrial or open space, the linear configuration of noise impacts from line sources may be more appropriately acknowledged through special attention to overall design characteristics of proposed residential developments.

It is recognized that all General Plan policies are not unconditionally acceptable for all development considerations. Planning attractive residential neighborhoods is a complex challenge which must consider a myriad of social, economic and environmental factors. Noise impact is one of many environmental factors which must be considered. Noise mitigation can occur through the use of several alternatives. When considering noise mitigation each development proposal must be evaluated with respect to its own

unique characteristics as well as to its relationship to the community. Noise Element consistency with other General Plan elements will aid in the attainment of logical and attractive neighborhoods through the provision of an integrated and compatible statement of policies for the City of Bakersfield.